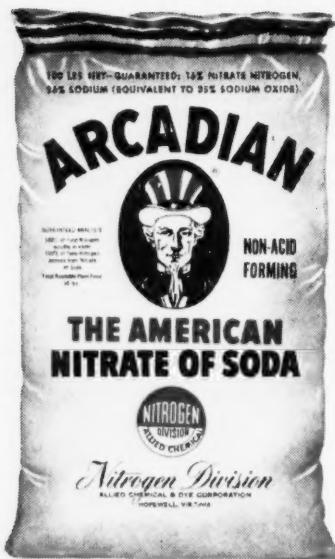


COMMERCIAL FERTILIZER

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Farmers prefer ARCADIAN, the American Nitrate of Soda, because it's made in large crystals and then screened and extra screened for free-flowing quality. It's easy to use in any type of fertilizer distributor.

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Here is another dependable nitrogen top-dressing material for any crop. A-N-L® Nitrogen Fertilizer contains 20.5% nitrogen — 10.2% in quick-acting nitrate form and 10.3% in long-lasting ammonia form. It also contains 7% magnesium oxide equivalent. This material is in pellet form and easy to distribute as top-dressing.



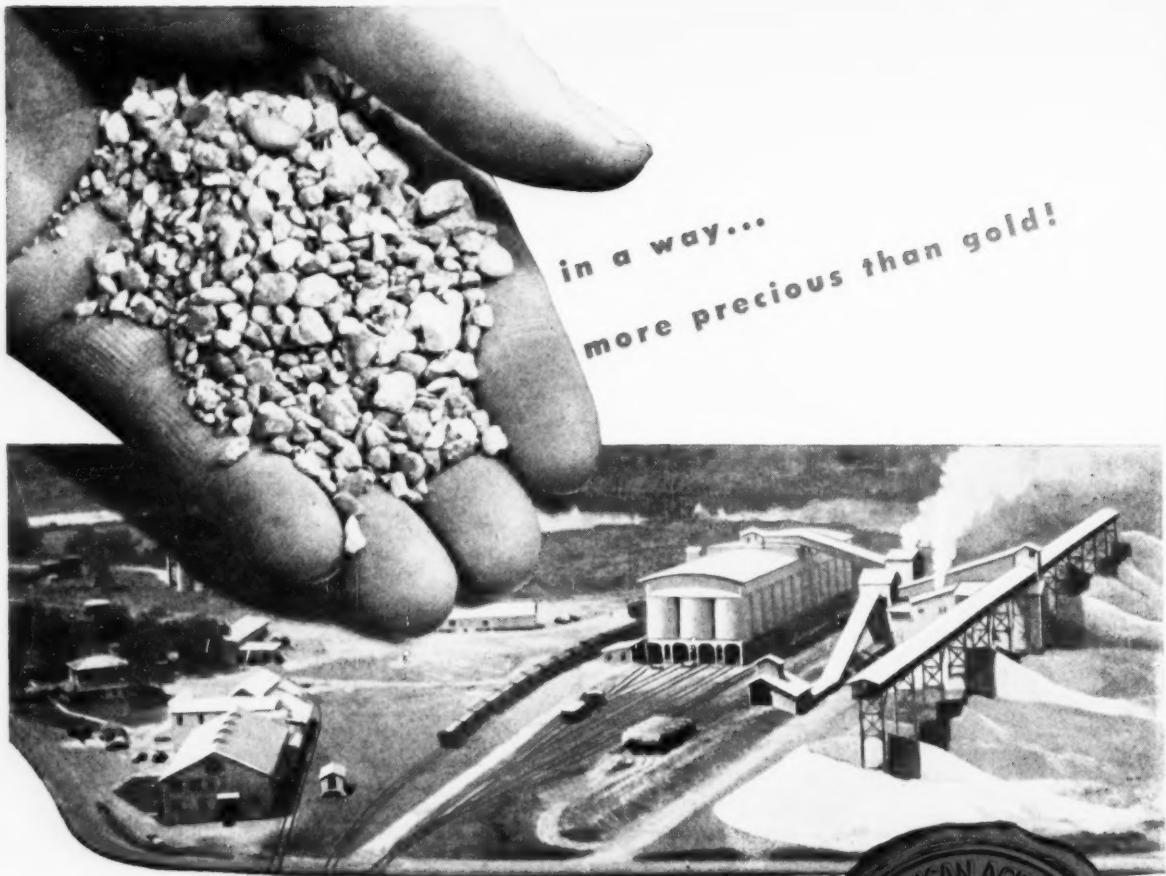
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OCTOBER, 1953



Air view showing dryers and rock storage at Pierce, Florida, headquarters of A.A.C. phosphate mining operations. (Top) Sample of Florida Pebble Phosphate Rock, source of phosphorus widely used in the chemical industries, in its elemental form as well as in phosphoric acid, phosphates and phosphorus compounds. Q This pebble rock is also the principal source of the most important—and most generally deficient—plant food element. Often called the Key to Life, phosphorus is essential in maintaining and improving crop yields. Health, growth, life itself, would be impossible without phosphorus . . . so in a way these phosphate pebbles are more precious than gold.



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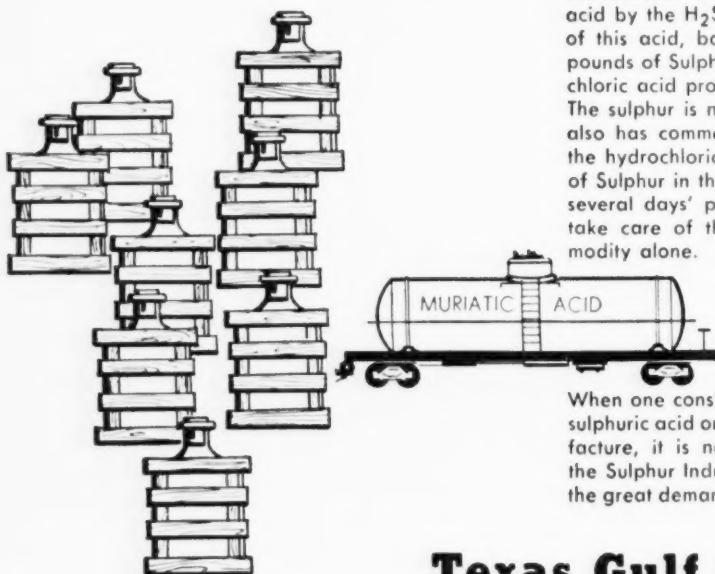
Thousands of tons

mined daily,

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Loading a ship with Sulphur at Galveston



PARAPHRASING an old saying: 'It takes a chemical to make a chemical,' certainly applies to hydrochloric acid.

No chemical engineer has to be told how hydrochloric acid is made but sometimes with the mind focussed on the word "hydrochloric" little thought is given to another word "sulphuric." It is this word that calls attention to the fact that to make one net ton of 20° Bé hydrochloric acid by the H_2SO_4 process requires about 950 pounds of this acid, basis 100%, which is equivalent to 320 pounds of Sulphur. About one third of the annual hydrochloric acid production is made by the use of sulphuric. The sulphur is not lost because salt cake, a by-product, also has commercial value. But any way you figure it, the hydrochloric acid industry is an important consumer of Sulphur in the form of sulphuric acid. In fact, it takes several days' production from all the Sulphur mines to take care of the annual production of this one commodity alone.

When one considers all the other chemicals that require sulphuric acid or other Sulphur compounds for their manufacture, it is not difficult to appreciate how faithfully the Sulphur Industry is serving industry today in spite of the great demands made upon it.

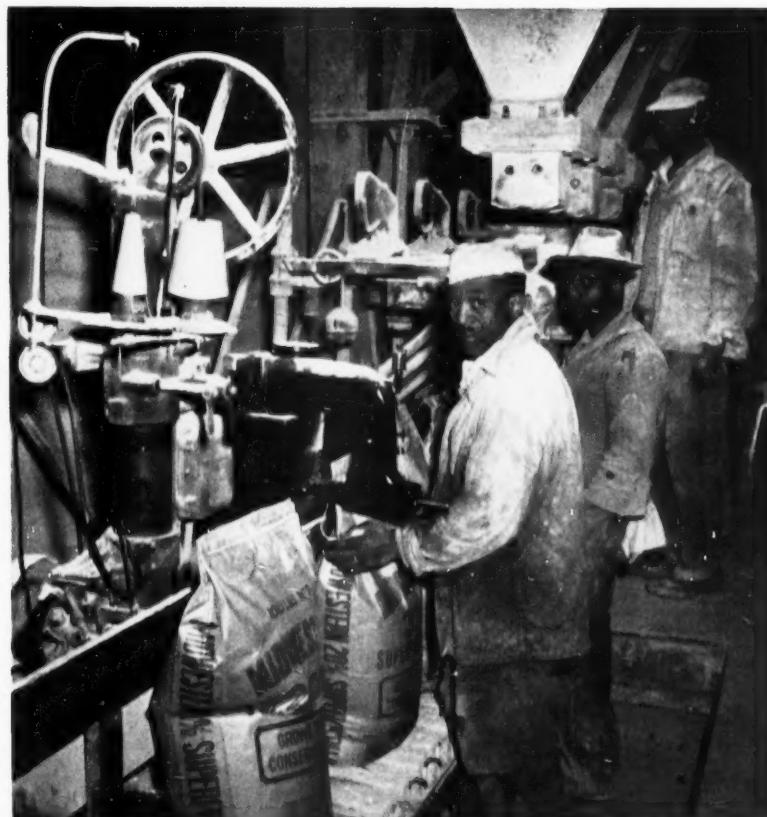
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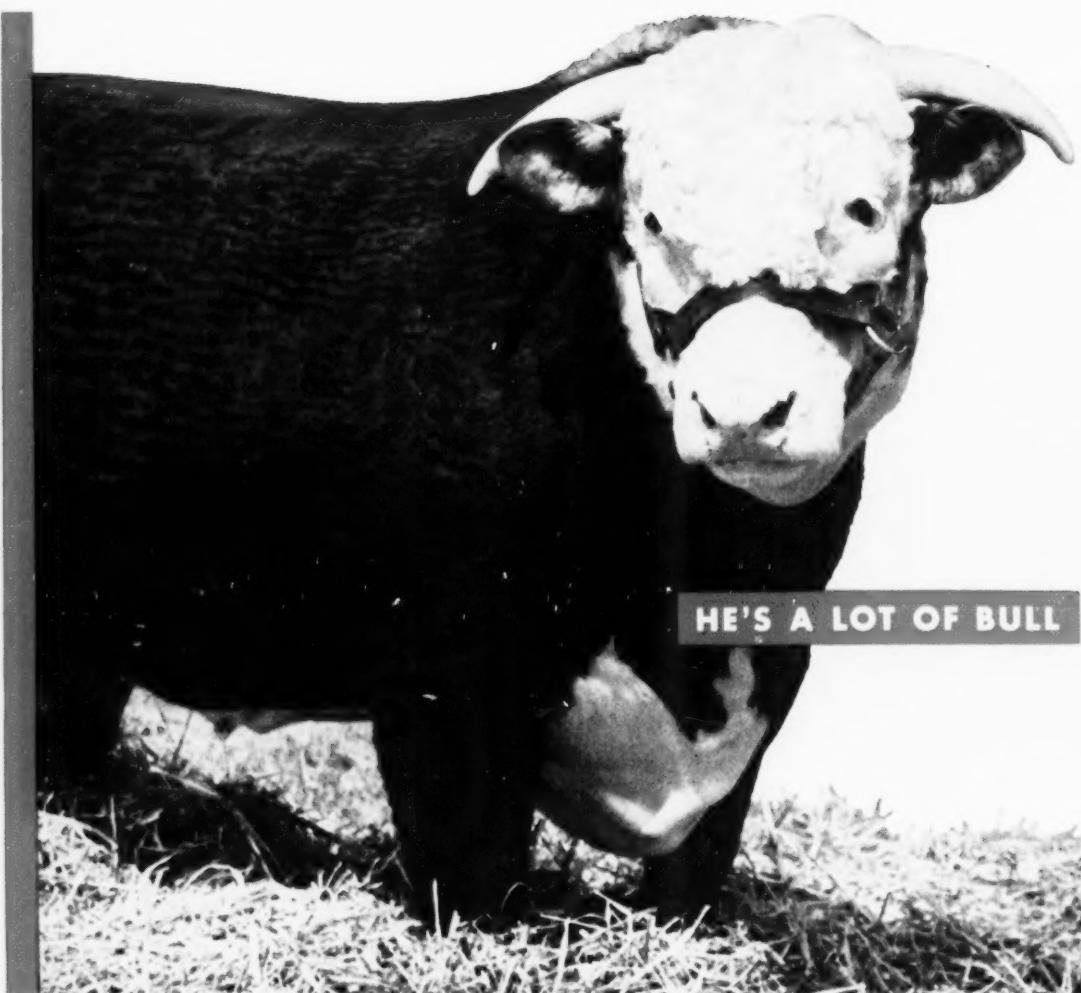
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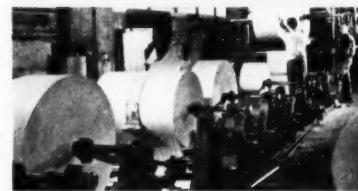
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COMMERCIAL FERTILIZER

ESTABLISHED 1910

October, 1953

Vol. 87 No. 4

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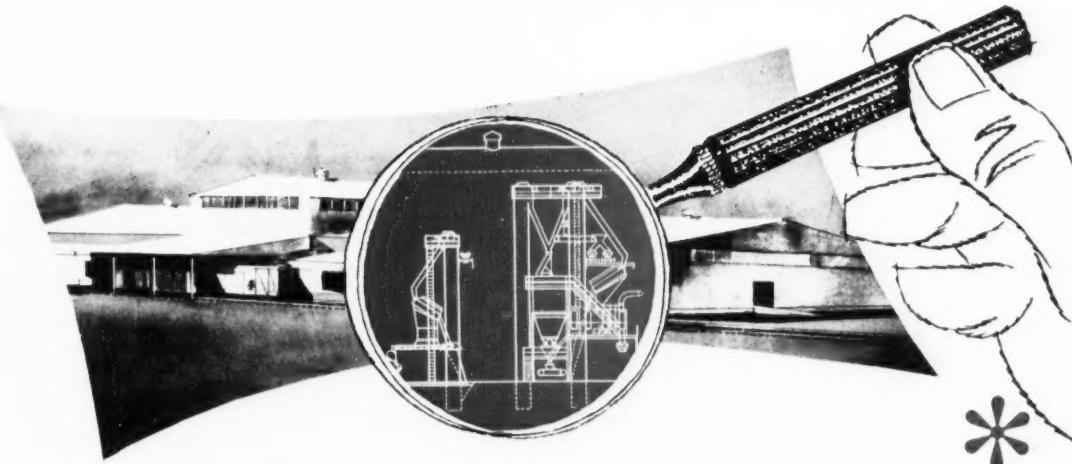
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Many years of experience in the fertilizer industry have given the Harte Company valuable knowledge about the development and application of the fertilizer processes. Extensive study and research have made Harte engineers cognizant of the over-all picture of fertilizer plant design, realizing that certain fundamentals must be followed while specializing each plant. Chemical processes, machinery, mechanical operations, production facilities are carefully studied and adapted to fit the needs of each individual fertilizer plant.

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JUST AROUND THE CORNER



By Vernon Mount

LIBERAL VS CONSERVATIVE seems slated to be more and more the line-up in this nation. The recent Democratic party meeting emphasized it once more. The time may well come when both Republican and Democratic labels may be rubbed out, and a frank renaming of parties take place. It has happened before, of course - and might be a lot more sensible than pretending we have any homogeneous parties in this land.

DEFENSE CUT-BACKS should be analyzed before we scream that the land is being left wide open to attack. It is well to remember that Ike was a 5-star general before he became President.

THE NEXT CONGRESS has plenty of controversial material warmed up. Farm policy; postal rates; taxes; foreign aid; social security; recession stoppers - to name a few at random. Get set for plenty of excitement...unless you are one of those who has recognized that much of the Congressional sound and fury is no more than that.

GERMANY can become a real force in international economic competition in the next few years. Adenauer has prestige like Eisenhower, and for the same reason. If he can use it as a lever to unite Germany, or even consolidate his aims for West Germany, first England and then others had better start watching their export markets.

Yours faithfully,



Raymond

Multi-Wall
PAPER
SHIPPING SACKS

The fertilizer shipping sacks that are doing a big job for the producer, packer, and shipper of commercial fertilizers.

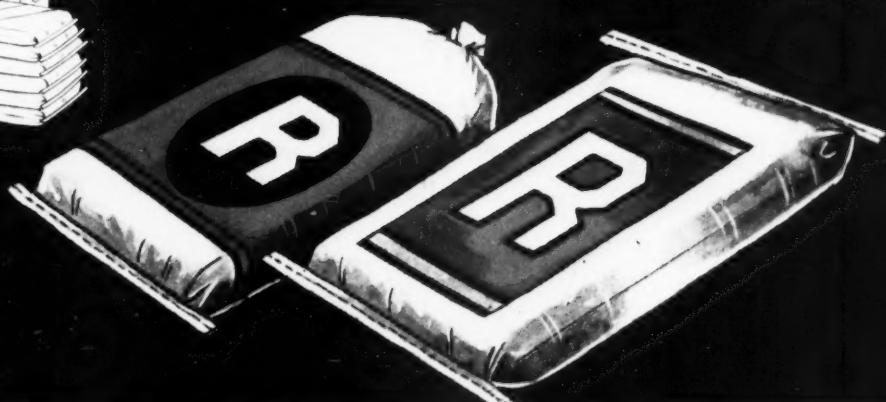
They are CUSTOM BUILT with valve or open mouth, sewn or pasted ends, in various sizes and strengths.

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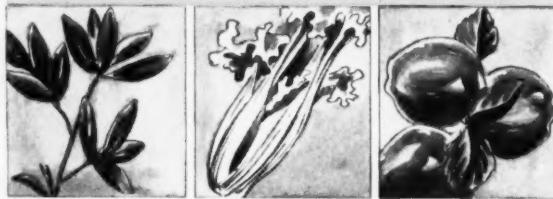
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TRONABOR*

(Agricultural Pentahydrate Borax)

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MORE MONEY PER YIELD WITH TRONABOR



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TRONABOR provides greater Alfalfa yield per acre. Better quality hay. Prevents "Yellow-top," puny, stunted leaves. Plants grow lush and strong.

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There's more money in TRONABOR-FED apples at harvest time. Fruit grow large and firm. TRONABOR prevents pitting of the surface, results in better grading.



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This new Butler Tank features great strength and complete protection throughout with openings to

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The 30,000-gallon Butler Tank is built according to the ASME Unfired Pressure Vessel Code. Tank heads, shells and manhole shells are of ASTM A-212, 70,000 PSI material. Thorough testing, including radiographing of weld junctions, declares its integrity as a pressure vessel before it wears the Butler trade mark.

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"the extra that pushes a sale ~~our~~ ^{your} way!"

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Hugh Latimer, Vice-President
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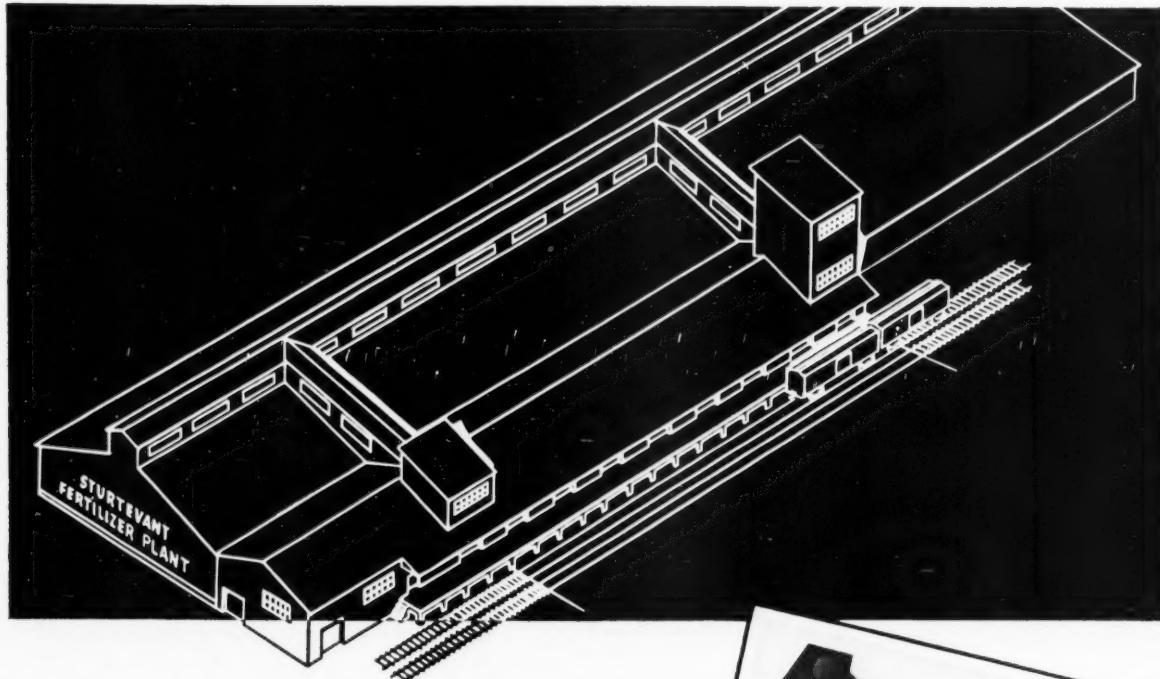


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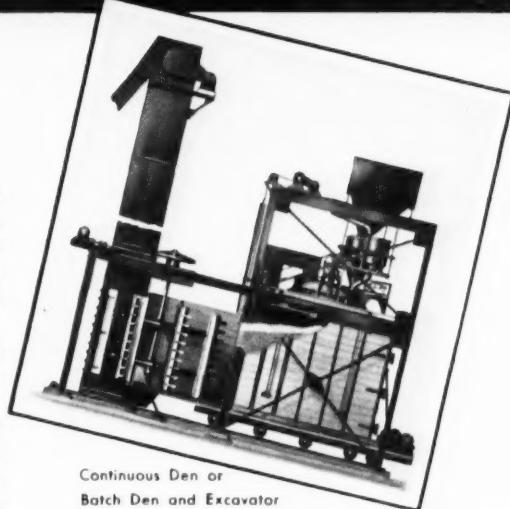


**Each designed to produce
maximum Fertilizer output**

For over 71 years, Sturtevant Mill Company has been closely associated with the fertilizer industry . . . designing and supervising the construction of complete plants, and building quality machinery from individual machines for specific applications to complete processes, that speeds up fertilizer output, reduces overall production costs.

A recognized leader in the industry, Sturtevant Mill with its vast fertilizer manufacturing experience and know-how can effect operating economies for you.

Whether you plan to build a new plant, modernize or buy new equipment, it will pay you to consult Sturtevant Mill. Our engineers, specialists in fertilizer manufacture, are available for consultation. Ask for their services, today. You will keep ahead with Sturtevant.



Continuous Den or
Batch Den and Excavator
for producing superphosphate.

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Designers of Complete Plants and Manufacturers of: CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS • MECHANICAL DENS
and EXCAVATORS • ELEVATORS • MIXERS

Spring top dressing of 8-8-8 helps increase wheat yield 25-35% for Julius Broerman, St. Marys, Ohio



This spring, Mr. Broerman applied 300 pounds per acre of 8-8-8 high-analysis fertilizer as a top dressing on wheat in a 19-acre field where corn and oats previously had been grown. This was in addition to a fall application of mixed fertilizer. His crop averaged better than 50 bushels to the acre—an increase of 25-35% over previous crops from the same field.

► Be sure your dealers will be supplied with good stocks of 8-8-8 and 10-10-10 for early spring sales! ◀

DEMAND for high nitrogen fertilizers is increasing all over the country as more men like Mr. Broerman actually see for themselves the increased yields that result from its use. Make certain that your dealers will have enough 8-8-8 and 10-10-10 on hand to be able to benefit from the early spring demand.

U-S-S Ammonium Sulphate can help you keep this demand on the increase by giving you top-quality nitrogen content in your complete fertilizers. Since U-S-S Ammonium Sulphate is a dry, free-running substance, it is easier to mix and easier to handle in distributing equipment. And it's thoroughly reliable in storage.

For complete information on U-S-S Ammonium Sulphate—either in bulk for mixing in your high-nitrogen fertilizers or bagged for direct application—contact our nearest Coal Chemical sales office or write directly to United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

Bigger yields for farmers mean better business for you

U·S·S AMMONIUM SULPHATE



UNITED STATES STEEL

**CFA's 30th Convention Slated
For Carmel, November 9-10**

The La Playa Hotel, Carmel, will be the headquarters for the 30th annual convention of the California Fertilizer Association, which meets November 9-10. Business sessions will be concentrated on November 9 and will be held at the Golden Bough Playhouse, in Carmel.

Speakers will include Dr. William A. Albrecht, Chairman, Department of Soils, University of Missouri; Dr. Russell Coleman, President, National Fertilizer Association, Washington, D. C.; Jesse W. Tapp, Vice President, Bank of America, San Francisco; Allen B. Lemmon, Chief, California Bureau of Chemistry, Sacramento; and M. E. McCollam, American Potash Institute, San Jose, who is chairman of the California Fertilizer Association Soil Improvement Committee.

The site of the convention is the picturesque Monterey Peninsula, and facilities for play and for serious business are excellent there. While the men hear outstanding speakers the ladies will have their own program of golf, fashion show, bridge, and the opportunity to shop in the unusual atmosphere Carmel offers.

There will of course be golf for the men; bowling, swimming, riding.

Delegates will be the guests of member concerns at three events during the Convention. The American Potash and Chemical Corporation is sponsor of a cocktail party to be held at the Monterey County Fair Grounds, Monterey, on Nov. 9, followed by a charcoal broiled steak dinner, auspices of the Shell Chemical Corporation at the Fair Grounds. On Nov. 10, a cocktail party sponsored by Balfour, Guthrie and Company, Ltd., at the Monterey Peninsula Country Club will precede the banquet. The ladies will be guests of the California Fertilizer Association at a cocktail party, luncheon and fashion show at the LaPlaya Hotel, Carmel, on Monday.

Reservations should be made direct to Mogens V. Hilborg, manager of the LaPlaya Hotel.

It Seems to Me

by BRUCE MORAN



Having long preached closer cooperation between the various forces serving the farmer, it seems to me pretty fine to read over several things in this issue which show how rapidly the goal is being reached.

NFA and TVA joined forces and the first tangible result is the new ammoniator, viewed by hundreds of fertilizer men last month. NFA wherever possible is collaborating with the local level educational societies and with the agronomists of the various states. Together they work out graphic evidence of the gains the farmer could make if he would follow College recommendations—and together they present the facts to farmers and those who influence farmers.

And all across the map, as we have listed them this month, the local level societies are functioning or getting organized or being planned, so that some day they will be a network of channels through which knowledge can flow both ways, to and from the farm, and so that all our forces for farm progress may be integrated.

Speed the day!

INDUSTRY CALENDAR

Date	Organization	Place	City	State
Oct. 16	Control Officials	Shoreham	Washington	D. C.
Oct. 21-22	Safety	Hamilton	Chicago	Ill.
Nov. 3-5	Pacific N. W.	Harrison Hot Springs	Harrison Hot Springs	B. C.
Nov. 9-10	CFA	La Playa	Carmel	Cal.
Nov. 10-20	Crop, Soil		Dallas	Tex.
Nov. 16-18	NFA	Biltmore	Atlanta,	Ga.
1954				
June 10-12	APFC	Homestead	Hot Springs	Va.
June 14-16	NFA	Greenbrier	White Sulphur	W. Va.

NFA - TVA COLLABORATION BEARS FRUIT IN NEW AMMONIATOR

Two hundred and eighty fertilizer men journeyed to TVA-land the middle of last month to witness demonstration of a continuous ammoniator. This was the first tangible fruit of the close collaboration between Tennessee Valley Authority and the National Fertilizer Association.

About two years ago the National Fertilizer Association and the Tennessee Valley Authority entered into a cooperative program intended to provide regular channels for the periodic exchange of advice and information on problems and findings in the fields of fertilizer process research, production, distribution and use. Technical committees representing TVA and NFA were appointed to carry out the objectives of this program.

As a result of meetings of these groups, NFA began publication of its monthly **Fertilizer Process Progress** publication designed to keep the fertilizer industry abreast of new developments in fertilizer processing methods resulting from research work conducted by TVA and other government and private organizations.

The NFA committee then prepared a compilation of fertilizer manufacturing problems which were believed to merit further research and submitted these to TVA for consideration for possible inclusion in its fertilizer research program. Included in these suggestions were the broad research areas of ammoniation and granulation. Technical panels of industry representatives were subsequently appointed by NFA to meet and consult with TVA personnel on their studies relating to these projects. The recent demonstration of the TVA developed ammoniator was a direct outgrowth of a meeting between NFA and TVA

representatives at which the TVA ammoniation project was discussed.

The NFA-TVA program is continuing, and it is hoped that it will prove of benefit to the fertilizer industry and the farmer.

When TVA was ready to show the new technique, NFA undertook to attract an audience of representative fertilizer people, and our staff pictures on the pages 21 and 24 attest their success. The crowd was big, it was representative, it was interested—and it was impressed.

Here was the pilot plant, which we show on page 22 in TVA staff photographs. As the group watched, the demonstration showed them the production of a 6-12-12, using ammoniating solution as the only nitrogen source, and a 10-20-20 with sulphuric added to nitrogen solution.

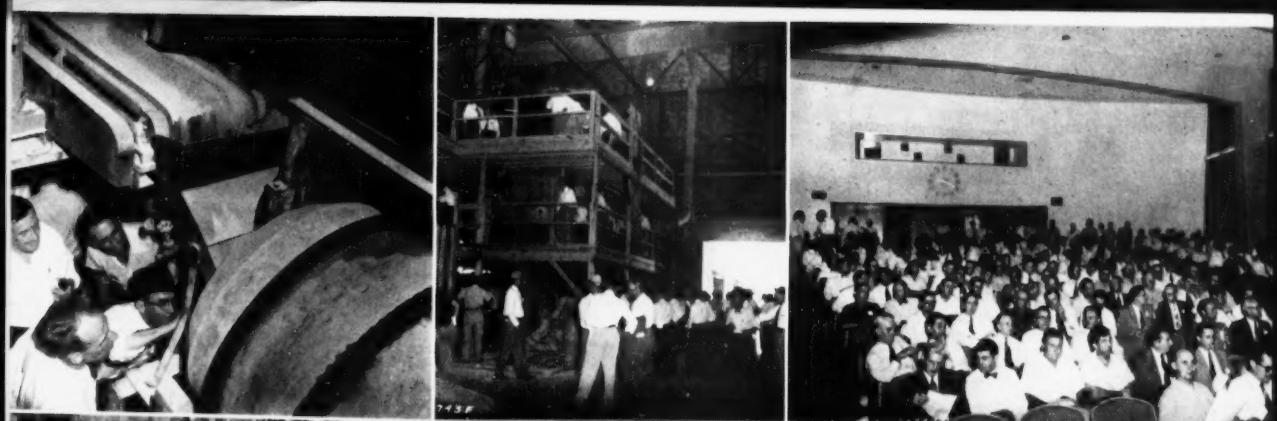
The TVA men explained the benefits of the new device: By introducing the ammoniating medium well beneath the rotating bed of solid materials, use can be made of gaseous or liquid anhydrous ammonia or ammoniating solutions, to achieve a high degree of ammoniation without excessive ammonia losses. Because the process is continuous, no time is wasted in charging and emptying the ammoniator. Granulation can be achieved under certain conditions without—in those cases—the need for special equipment. Condensation is eliminated because water vapor is swept out by a current of air, thus avoiding the wetting of the incoming charge. A reduction in labor costs should result from continuous ammoniation.

We make no effort here to give you a technical description of the ammoniator, because such information properly should come direct to the industry from the Authority. NFA has bulletined its members

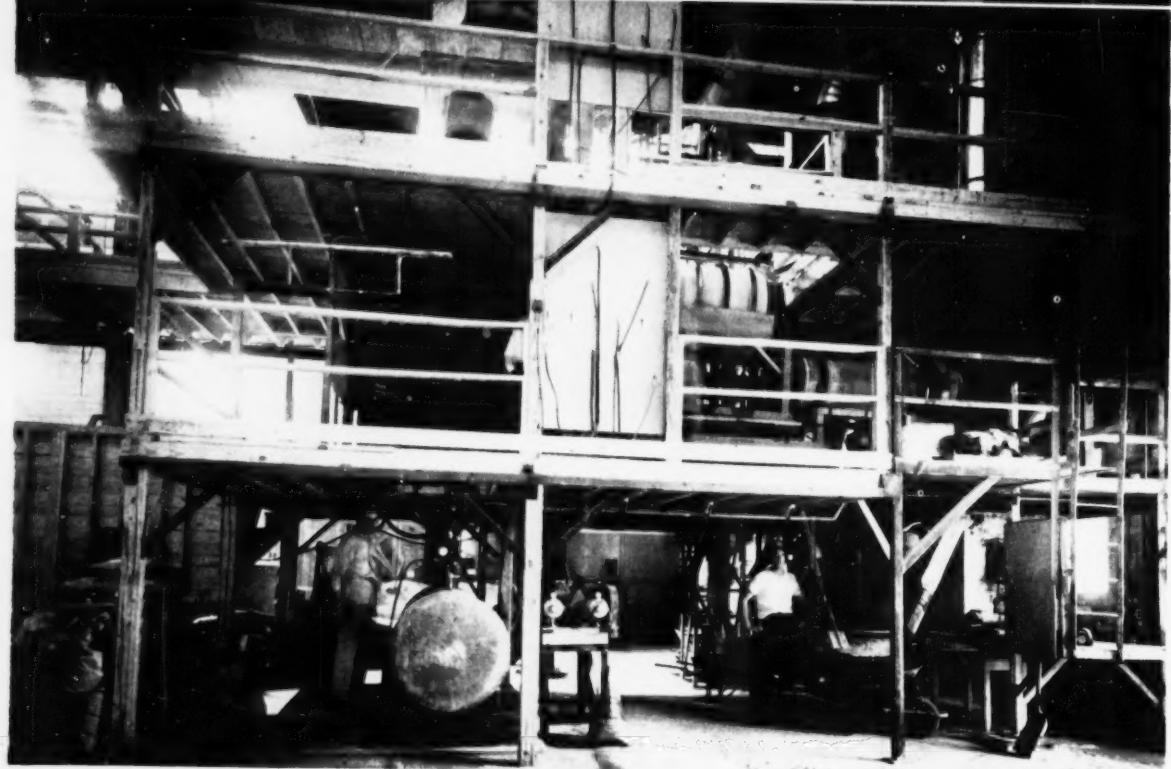
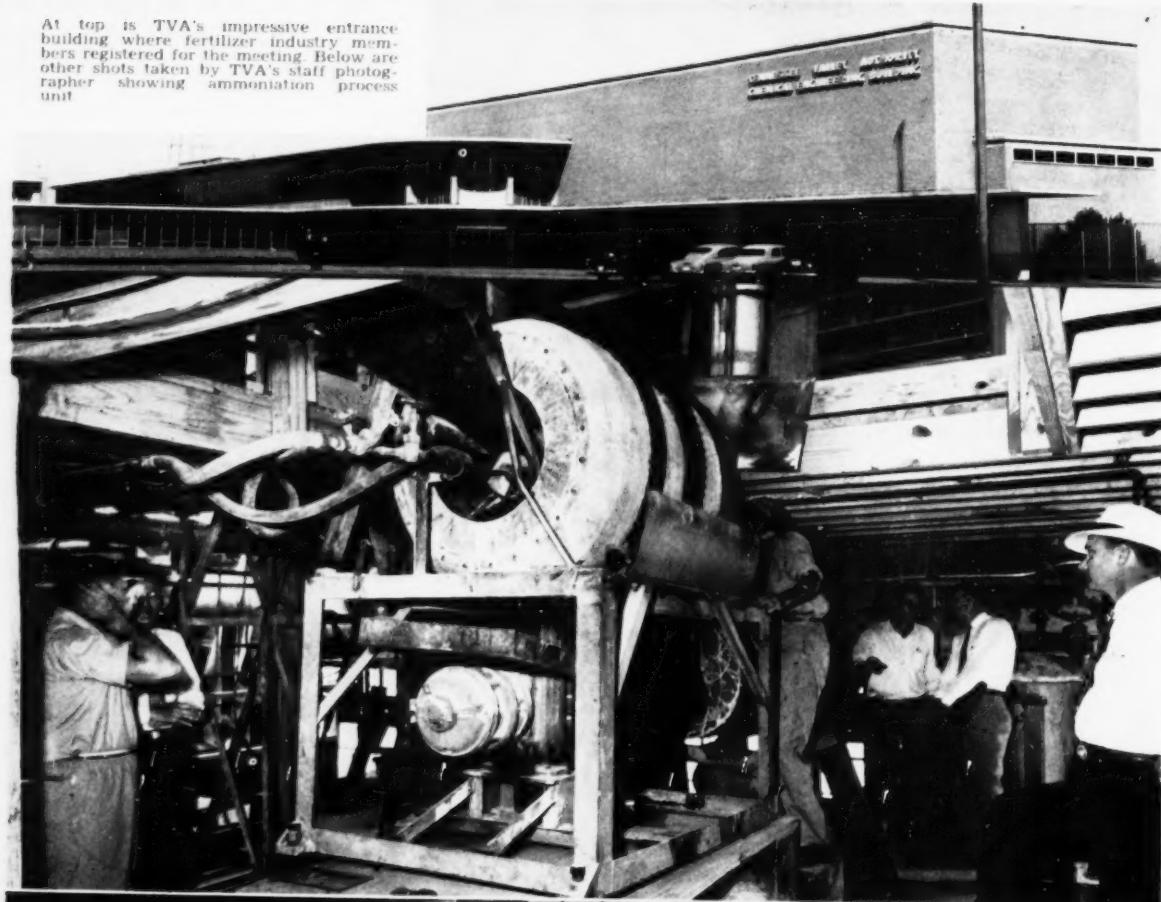
with data which include drawings of the equipment, as presented during the demonstration by J. H. Walt-hall and L. D. Yates of TVA. The information is also available upon request to TVA's Division of Chemical Development, Wilson Dam, Ala.

KEY TO PICTURES

Pictures 1, 2, 3 and 4 were made by TVA's staff photographer during the ammoniation demonstration at Muscle Shoals. The remainder of the pictures on this page were made by Commercial Fertilizer. 5. L. D. Yates, Project Engineer, TVA; Ed Kapusta, National Fertilizer Assoc., Washington. 6. Grayson Morris, Southern States Cooperative, Richmond, at left, joins group looking down on ammoniator. 7. Albert Joiner, Virginia-Carolina Chemical Corp., Birmingham, Roy McLendon, Mathieson Chemical Corp., Jackson, Miss. 8. Al Heisler and Joe Prosser, both of Baugh & Sons, Baltimore. Frank Taylor, Oregon-Washington Fertilizer Co., Seattle. 9. W. R. Baugh, Meridian Fertilizer Co., Hattiesburg, Joe Harrell, Southwest Potash Corp., Atlanta. 10. Aaron Baxter and H. H. Tucker, both of Coke Oven Ammonia Research Bureau, Columbus, Ohio. E. R. Banong, Canada Packers, Ltd., Ontario. 11. Bill Schaffnit, Lisle Ross, and W. R. Hodder, all of Stedman Foundry & Machine Co. 12. R. R. Hull, I. P. Thomas & Son, Camden, Dale Kieffer, Smith-Douglas Co., Norfolk. L. V. Clegg, Canadian Industries, Montreal. Alfred Spillman, G. L. F. Soil Bldg. Service, Baltimore, Gus Mautner, Baugh & Sons, Baltimore. 13. Bill Porterfield, U. S. Potash Co., New York. Bill Tyler, Longhorn Brokerage and Engr. Co., Sulphur Springs, Tex. Ralph Boynton, U. S. Potash Co., Atlanta. 14. George Earnest, F. S. Royster Guano Co., Norfolk. Bill Pritchett, Southern Zonolite Co., Atlanta, Ga. G. Pedersen, F. S. Royster, Madison, Wis. 15. John Mooar, and A. T. Glynn, both of Sturtevant Mill Co. 16. W. J. Culpepper, Georgia Fertilizer Co., Valdosta. E. M. Parker, Spencer Chemical Co., Aaron Baxter, Coke Oven Ammonia Bureau, Columbus. 17. Pete Wallace, Stanley Hackett and Harry Bumgardner, all of Dixie Fertilizer Co., Shreveport. 18. O. H. Sale Fertilizer Equipment Sales Corp., Atlanta. Bayard Baldridge, III, South States Phosphate & Fert. Co., Savannah. 19. Harold Trammell, Farmers Fertilizer Co., Texarkana. Allen Jackson, Fertilizer Equipment Sales Corp., Atlanta. Robert Lassiter, Lion Oil Co., El Dorado, Myron Russell, Guaranty Seed Co., Bunkie, La. 20. J. R. Phillips, Miss Chemical Corp., Vicksburg. E. C. Foltz, Jr., General American Trans. Corp., Louisville. J. D. Drake, Miss Chemical Corp. 21. A. V. Slack, TVA; Tom Bridgers, Farmers Cotton Oil Co., Wilson, N. C. G. C. Hicks, TVA.



At top is TVA's impressive entrance building where fertilizer industry members registered for the meeting. Below are other shots taken by TVA's staff photographer showing ammoniation process unit.



in

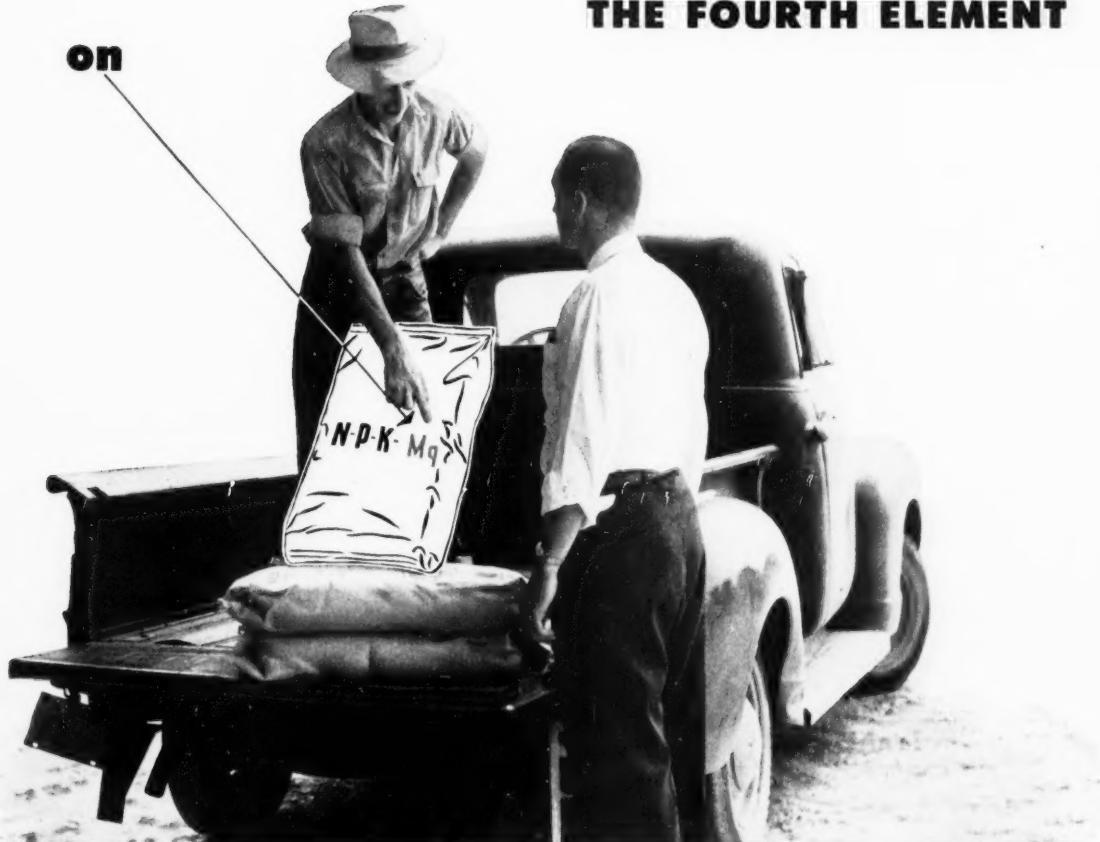
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THE FOURTH ELEMENT

on



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Your dealers want the fourth element to give them a better product to sell in a highly competitive market. Fertilizer manufacturers from coast to coast have found that the most practical and economical way to include magnesium in soluble form in their quality mixed fertilizers is with *Sul-Po-Mag*.

Sul-Po-Mag is a properly balanced combination of sulfate of magnesium and sulfate of potash. Both are water-soluble and immediately available to growing crops. *Sul-Po-Mag* is produced exclusively by International in bulk for mixed fertilizers and bagged for direct application.

Use *Sul-Po-Mag*, containing soluble magnesium, the *fourth plant food element*. You'll give the dealer a fertilizer he can merchandise profitably—the farmer, a more complete fertilizer for greater crop yields of higher quality. Put it in the bag, put it on the bag: Nitrogen—Phosphate—Potash—Magnesium.

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Potash Division



INTERNATIONAL MINERALS & CHEMICAL CORPORATION

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1. After lunch group rests in the shade. **2.** C. D. Shallenberger, Shreveport Fertilizer Works, Shreveport, Gaines Boynton, International Minerals & Chemical Corporation, Atlanta. **3.** Ben Garrett, Alliance Fertilizer Co., Ellerson, Va., Dudley George, Richmond Guano Co., Richmond. **4.** W. H. Woodward, Farm Fertilizer, Inc., Omaha, G. W. Pittcock, William Stone Sons, Ltd., Ontario. **5.** Dave Williams, F. H. Peavy Co., Minneapolis, R. W. Phillips, Chemical Engineering Service, Green Bay, P. F. Scheunemann, and Al Johnson, both of F. H. Peavy Company. **6.** W. R. Baughn, Meridian Fertilizer Co., Hattiesburg, Tommy Thomson, Atlanta Utility Works, Atlanta. **7.** N. H. Love, Commonwealth Fertilizer Co., Russellville, Ky. **8.** W. C. Lea-

sure, Houston, and J. F. Walters, New Orleans, both of Syntron Company. **9.** John Whitney, Chemical Construction Corp., New York, H. J. Weiland and H. C. Davis, both of Alabama By-Products Co., Birmingham. **10.** O. J. Underwood, Sheffield, and John Howard, Cullman, both of Southern Cotton Oil Co. **11.** F. S. Walters, H. F. Lange, R. H. Seiffens, C. E. Barclay, all of International Minerals & Chemical Corp., Chicago, Ill. **12.** H. E. Graham and A. O. Hallman, both of Blytheville Fertilizer Co., Blytheville. **13.** W. H. "Buck" Applington, Potash Co. of America, Atlanta. **14.** H. E. Gallison, Plainfield, and W. A. Fowler, Birmingham, both of Worthington Corporation. **15.** B. E. Mitchell, Albertville, Ala., Public Schools, Bruce Cloaninger,

Clemson College, Clemson. **16.** W. E. Weems, American Cyanamid Co., Louisville, Frank Reedy and T. H. Arnold, both of Green & Reedy, Franklinton, La., J. T. Carlisle, Jacksonville Fertilizer Co., Jacksonville, Tex. **17.** G. L. Downey, Lincoln Service & Supply Co., Grand Isle, Neb., R. W. Banks, Banks Fertilizer Co., St. Matthews, S. C. John Sanders, Spencer Chemical Co., Atlanta, Roy Fuller, Montgomery, and Herb Davis, Columbia, both of Spencer. **18.** George Sloan, Wilmington Fertilizer Co., Wilmington, N. C., Robbie Robinson, Atlanta Utility Works, Atlanta, J. I. Owens, Liberty Mfg. Company, Red Spring, N. C., and Clarence Durham, Dixie Guano Co., Laurinburg.





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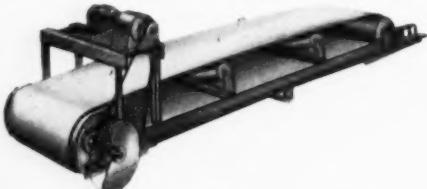
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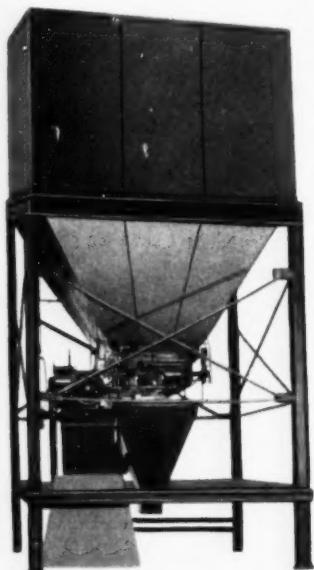
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Custom made to individual requirements, D-K Conveyors are constructed with anti-friction bearings and quality components. Each device is specifically designed for a particular operation with flat surface of troughing belts either stationary or shuttle type. Characteristic D-K construction features easy maintenance and adjustment.



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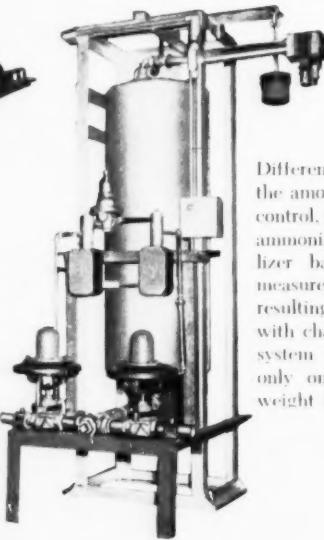


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D-K AUTOMATIC SOLUTION TANKS

Different only in the materials used and in the amount of pressure they are designed to control, these tanks are for adding anhydrous ammonia or nitrogen solution to the fertilizer batch in the mixer. Solutions are measured by weight rather than by volume resulting in a more accurate measure even with changing temperature conditions. The system is entirely automatic and requires only one operator who also operates the weight hopper and mixing unit.



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Designed for easy adjustment and maintenance, D-K Elevators feature conveniently located clean out doors and readily accessible take-ups. Easily removable inspection doors are provided in the discharge chute and discharge head. Leg sections are fabricated in ten foot sections with ends bolted to side pieces for easy erection and repair.

D-K CLUSTER HOPPER

Normal operation of the D-K Cluster Hopper requires only four men . . . two men operating pay loaders, one man operating swivel chute and one man weighing. Bins are available in 6, 9 or 12 bin clusters of 5 ton or 10 ton capacities to meet customer requirements. Valves to discharge individual bins are hand operated. The system is strong, simple, fast, easy to operate, and gives a very accurate control over the flow of material.

NEWS OF LOCAL LEVEL SOCIETIES

SOUTH CAROLINA

130 STRONG MEETS AT CLEMSON

Reminiscences of 40 years ago, the accumulated wisdom of 40 years of selling, a modern program for the good of South Carolina, the Davis' went out and the Mac's came into office. There, in a nutshell, is the story of the fourth annual meeting of the first of the state level Plant Food Educational Societies — SCPFES.

They met—130 strong—at Clemson's really beautiful and well-managed big new 300-room hotel, which comfortably absorbs big crowds, furnishing good food, good rooms, and plenty of meeting space. It was a one-day affair, with the general business meeting in the afternoon, election of the board, which promptly went into executive session and elected the new president and the new secretary-treasurer. Herb Davis, Spencer Chemical, Columbia and Peehee Davis, Epting Distributing Co., Leesville, who had served their prescribed two years, were succeeded by Fred McNatt, Nitrogen Division, Clemson, as president, and L. G. McGraw, American Limestone, Sandy Springs.

The highlights of the day were many. B. M. Edwards, chairman of a leading South Carolina bank reminisced of the days when he ran a railroad—"only fifty miles long, but just as wide as the Southern" which annually shipped into his county 25,000 tons of fertilizer—and shipped out 25,000 bales of cotton. The fertilizer, back in those days, he said, was called 8-3-3 because it was 8 parts sand, 3 parts dirt and 3 parts trash. His railroad flourished because it was considered practically treason to raise anything but cotton—and all else had to be shipped in.

When fathers stopped raising

COLEMAN PRAISES STATE LEVEL SOCIETIES

The South Carolina Plant Food Educational Society appears to have been formed with a lot of thought and planning. This type of state organization to which the individual belongs and takes an active part seems to be a most effective tool in promoting sound fertilizer uses and developing a better relationship between the educational institutions and industry. It is my opinion that if each of the states which do not now have an organization could form a society patterned along the lines of the one in South Carolina, our industry could move forward much faster in promoting sound fertilizer usage.

RUSSELL COLEMAN, President,
NATIONAL FERTILIZER ASSOCIATION

September 11, 1953



Front Row: Herb Davis, Spencer Chemical Co., Columbia, L. G. McGraw, Sec.-Treas., SCPFES, American Limestone Company Sales Representative, Sandy Springs, S. C.; Fred L. McNatt, President, SCPFES, Agronomist, Nitrogen Division, Allied Chemical & Dye Corp., Clemson, E. D. Sallenger, Vice President, SCPFES, Southern Fertilizer and Chemical Co., Florence, J. N. Davis, Epting Distributing Co., Leesville.

Back Row: A. J. Sittin, Pendleton Oil Mill, Pendleton, J. C. Calhoun, International Minerals & Chemical Corp., Hartsville, D. M. Avinger, Holly Hill Fertilizer Co., Holly Hill, D. H. Banks, Banks Fertilizer Co., St. Matthews, John Bryan, Naco Fertilizer Co., Charleston, G. L. Harvin, Virginia-Carolina Chemical Co., Columbia, Louis Smith, F. S. Royster Guano Co., Columbia; absent when picture was made: J. Hampton Logan, Jr., Logan-Robinson Fertilizer Co.

their sons to leave the farm and take up white-collar occupations, and instead sent them to Ag schools, where they could learn to be happy on a farm, his railroad rusted away because the county became virtually self-sustaining. He was introduced by J. H. Epting, Epting Distributing Company.

Dr. R. F. Poole, Clemson president, and Dr. M. D. Farrar, Clemson Dean of Agriculture, outlined a newly coordinated program of the three major phases of the College program, integrated now so they work as a team. A major project of the Research phase of this program is Irrigation—to determine the best time to use such water as is available; using it for the appli-

cation of fertilizers and pesticides; the development of ponds for storage; mechanization of the operation, as well—of course—as general farm mechanization research.

As Dr. Poole puts it—"Teachers have to be smarter these days to keep ahead of the smarter farmers we have now." And they need the help, both men said, of those in the field contacting the farm.

Hugh Woodle, Clemson Extension Service, and the daddy of the state level plant food educational society idea, said they had told him the plan would never work. The industry, they had said, would not cooperate with itself, much less with anyone else. But the industry has backed

the idea with money and manpower. The national associations have pitched in to help (of which more in a moment) and all are working together. A sample of the result: South Carolina's corn yield is up 50%—"not what we hope for" he said—"but progress."

Another highlight was the presentation by Russell Coleman, NFA president, of a set of slides, similar to those we published in Commercial Fertilizer's August issue as presented by NFA's v-p Allstetter to the Pacific Northwest meeting. They

show, crop by crop, how much more the farmers of the State would make if they would only follow the College recommendations as to plant food use. This particular set adds up to a fresh \$187,000,000 which is now lost by South Carolina farmers who do not follow the recommendations. The program, which is being worked out state by state is, of course, a project of NFA's to underline the fact that in times like these the farmer must use fertilizer to cut his unit costs in terms of smaller prices. The data is produc-

ed by NFA and the local College agronomists in each case, working as a team.

As Russ Coleman ended his presentation he summed up: "Tell your banks about this. Too many of them are not as enlightened as Mr. Edwards."

Bruce Cloaninger, who heads Clemson's department of Fertilizer Inspection and Analysis (incidentally the original agronomic function of the school) outlined the changes to be made in the laws governing fertilizer marketing in South Caro-

STAFF PICTURES TAKEN AT THE SCPFES MEETING:
1. J. N. "Pee-wee" Davis, Epting Distributing Company, Leesville, comes first because he, as the busy, bustling secretary of the association, paved the way for a smooth meeting. **2.** Herb Davis, Spencer Chemical Co., Columbia, retiring president under whose leadership the organization has demonstrated ably what a state level society can accomplish. **3.** Dr. R. F. Poole, Clemson's president, who welcomed the group. **4.** Dr. M. D. Farrar, Clemson's Dean of Agriculture. **5.** Hugh Woodle, Clemson, who is responsible for the whole state level educational society idea. **6.** Bruce D. Cloaninger, Clemson's fertilizer inspection and analysis department head. **7.** J. H. Epting, Epting Distributing Co., Lees-

ville, who welcomed "the opportunity to say nice things about his banker to his face" and presented **8.** B. M. Edwards, Chairman of the South Carolina National Bank. **9.** Russell Coleman, NFA President, who presented the slide picture of what South Carolina could do if farmers followed the College recommendations. **10.** D. M. "Booty" Avinger, Holly Hill Fertilizer Co., Holly Hill, one of the finest toasters under whom we have ever sat. **11.** J. W. "Jack" Rutland, Vice-president, Southern States Phosphate & Fertilizer Co., Savannah. **12.** Joe Shepherd, V-C Chemical Co., Atlanta, president of the Georgia Plant Food Educational Society.



lina, including a simplification of information on the bag, better timing of reports for the convenience of the industry, and other constructive changes, similar to those which have been worked out in Georgia by collaboration between the authorities and the Plant Food Society there.

He spoke encouragingly of the increase of plant food content, which in South Carolina has doubled since Clemson entered the picture. "As labor gets scarce—and may I say sorrier?—analysis have climbed" he said.

He set the stage for the talk on selling which followed that evening, by pointing out the urgent need, for the farmer's own good, to sell him more fertilizer.

During the session, very kind words were said concerning the co-operation of Commercial Fertilizer Magazine in helping spread the state level plant food society idea—which is now organized or in process of organization in 15 states.

The election of directors ended the session.

The banquet which followed was the gayest we have ever attended anywhere. D. M. "Booty" Avinger, who manages the Holly Hill Fertilizer Company, Holly Hill, has a dry wit that instantly sets the note of informality and gaiety. He presented those at the head table, including Joe Shepherd, V-C Chemical, Atlanta, president of the Georgia Society. And then introduced Jack Rutland.

Jack explained his new activity, which we reported last month, and proceeded to unburden himself of things which have come to him to say over a period of more than 40 years selling in the fertilizer industry. With the general tenor, our readers are familiar because Jack made a formal talk at the Georgia Society meeting some months ago, which we printed in full. But this was a good-natured ribbing of the industry.

Picking up B. M. Edward's "8-3-3" fertilizer, he said too often the industry was offering a four-ingredient product, whose analysis consisted of N-P-K—and H, which

stands for Hokum. His major plea—to get rid of the hokum, to stop letting the colleges do all the selling for us, to start selling ourselves, and selling on a constructive basis.

"In my forty years experience, I have never seen a price cut make one ton difference in the quantity of fertilizer the farmers will buy" he said. We need stability, and price-cutting destroys it while constructive selling builds it up. Back up the colleges in their recommendations and we'll sell more fertilizer at an honest price. Dual selling—the title of his talk—our salesmen working with the colleges instead of just taking orders at cut prices. Really help the farmer and take the H out of the analysis. Get rid of the hokum. For fertilizer is one thing on which the farmer cannot lose...

it always comes back to him in better crops.

Back forty years ago a fertilizer man did not mention his connection in polite society. Today the fertilizer industry is recognized as the one great force that stands against America becoming a land of barren soils, like those of the Old World.

Senator Russell Feature Of GPFES December Meeting

When the Georgia Plant Food Educational Society meets in Athens December 9 or 10 (date to be announced) the featured speaker will be Senator Richard Russell, whose close connection with agriculture, and whose sound ideas on the subject, have long been a major factor in the Senate deliberations.

PROGRESS REPORT ON THE LOCAL LEVEL SOCIETIES

Compiled by NFA

ALABAMA—The State Experiment Station and the Extension Service have agreed to throw their full weight behind this program. At least one meeting has been held to discuss it. No formal industry organization has yet been developed.

ARIZONA—The Arizona Agricultural Chemical Association is formally organized to work with the University. Extension Service feels its present program is effective in promoting proper fertilizer use.

ARKANSAS—It is understood that this program will be discussed and an attempt will be made to develop a more effective program at the annual fertilizer conference this fall.

CALIFORNIA — The California Fertilizer Association has been organized for many years and adequately represents the industry in that State. The University of California feels its present educational and research program is adequate. (NFA is presently working with

CFA in producing a new movie stressing the economic value of fertilizer. Preliminary discussions have been held with the bankers and it is hoped that a bankers' publication can be developed soon.

COLORADO—A joint Industry-University Committee has been set up to help develop a more effective fertilizer utilization program. A most satisfactory meeting was held in the spring of 1953. (NFA is working with the college to interpret fertilizer recommendations into economic terms.)

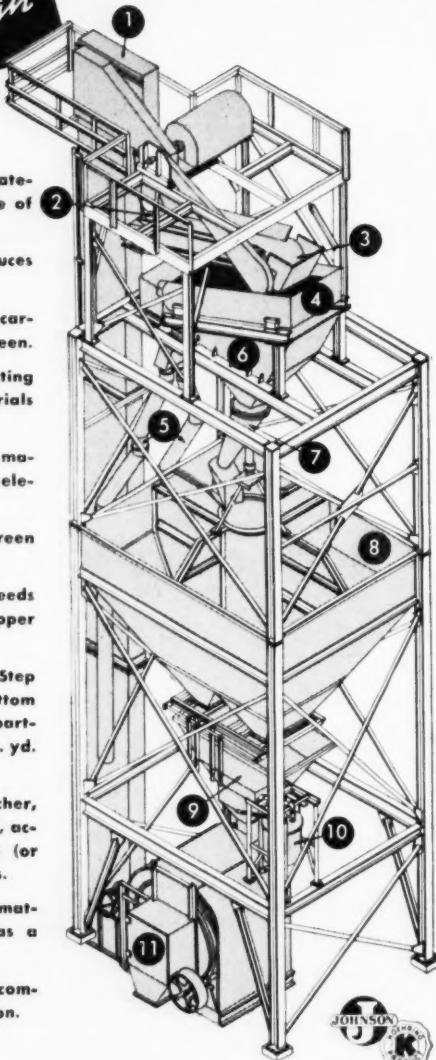
NEW ENGLAND STATES—Connecticut, Massachusetts, Maine, Vermont, Rhode Island and New Hampshire.

These States have been organized for many years and have worked closely and effectively with the fertilizer industry. Usually two fertilizer conferences are held annually. (This fall NFA is sponsoring a conference in Connecticut. A New England bankers' publication emphasizing economic value of fertilizer usage is being prepared.)

*take a 1-minute
"tour" through*

JOHNSON BLENDING PLANT

1. Chain bucket elevator feeds material into the plant at the rate of 1000 cu. ft. per hour.
2. High-speed clad breaker reduces materials to required size.
3. Self-cleaning belt conveyor carries pulverized material to screen.
4. Vibrating, 4x10-foot separating screen controls size of materials fed into collecting hopper.
5. Reject pipes return oversize material from screen to bucket elevator for re-sizing.
6. Collecting hopper under screen charges pivoted distributor.
7. Full-revolving distributor feeds screened material from hopper into sectional storage bin.
8. Johnson 65 cu. yd. Step-by-Step Bin, with fast-flowing 60° bottom slopes, has four 15-yd. compartments arranged around a 5 cu. yd. central tank.
9. Multiple-material weigh batcher, with 5,000-lb. dial-head scale, accurately weighs up to five (or more) fine-grained materials.
10. For adding liquids, semi-automatic solution weigh-batcher has a capacity of 500 lbs.
11. Mixing unit (2-ton capacity) completes final blending operation.



Eliminating slow, costly manual methods, Johnson fertilizer plants elevate, pulverize, screen, batch, and blend materials in one continuous cycle of operation. Owners report substantial increases in production and savings in manpower. Installation shown here is one of two Johnson plants developed to meet the

special needs of a large midwestern fertilizer manufacturer. It is typical of the many sizes and types of Johnson plants available for mixing and blending all types of materials . . . manually-operated or fully automatic. You can get many profitable ideas on plants and accessories from Johnson distributor . . . or write us.

1349

**Mail to: C. S. JOHNSON CO., CHAMPAIGN, ILL.
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Send us more data on Johnson fertilizer blending plants. Have Johnson distributor call.

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Also interested in: bulk phosphate storage plants aeration systems screw conveyors
 bucket elevators bins hoppers batchers clamshell buckets

FLORIDA—The Florida Agricultural Research Institute is well organized to represent our industry. In cooperation with the University it has carried on an effective educational and research program for years.

GEORGIA—The Georgia Plant Food Educational Society has been organized, and with the University, is promoting an effective program. (NFA is working both with the Society and with the University to interpret its recommendations into economic terms and to distribute this information. Preliminary discussions have been held concerning a bankers' brochure for that State.)

NORTHWEST STATES — Washington, Oregon and Idaho.

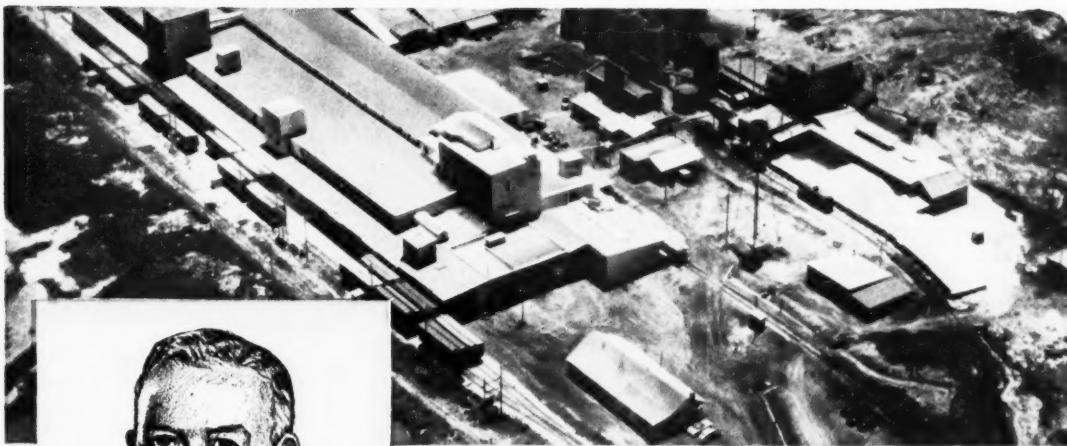
The Northwest Plant Food Association, with industry and University officials from those States, is organized to carry on an improved fertilizer utilization program. (NFA has prepared fertilizer response charts for each of these States. Discussions with bankers in Oregon and Washington have encouraged us to believe a bankers' brochure will be produced in the near future in those States.)

KANSAS—The Kansas Fertilizer Council has been organized to promote, in cooperation with Kansas State, proper fertilizer usage. This Council is active and has several projects which it is sponsoring.

KENTUCKY—The industry, although informally organized, has worked with the University for years. Numerous successful cooperative projects, such as the Green Pastures Program, have been carried on in the past. Discussions have been held on increasing the promotion of proper fertilizer usage here. A formal meeting is scheduled for October 6. (NFA is working with the University on interpreting fertilizer response data. Informal discussions have also been held with the banker representatives. We feel confident that a bankers' brochure here is forthcoming.

LOUISIANA — The Louisiana Plant Food Educational Society has been organized and is working effectively with the University.

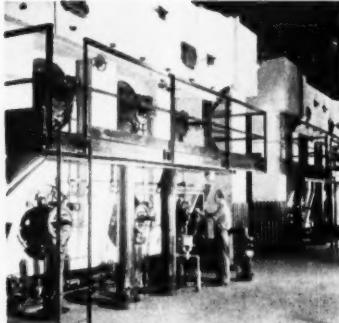
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MARYLAND—No formal organization has been developed in Maryland but the Extension Service is conducting a rather effective program in this field. Discussions have been held between Extension Director Haut and Dr. Sauchelli on improving the program. (NFA has worked with the University on interpreting their fertilizer response data into economic terms. Considerable publicity has been given to this information through bankers' publications and through other means.

MICHIGAN—Experiment Station Director Turk has outlined the program which is being conducted in Michigan. He apparently feels that their program is adequate to promote the fertilizer utilization plan until farm income drops further. Then additional educational effort will be necessary.

MINNESOTA—Informal discussions have been held by industry representatives with University officials who have indicated a definite interest in stepping up the educational program in this field. (The Extension Service this year used the NFA movie, CASH IN ON CORN, as a basis for a broad educational program.)

MISSISSIPPI—Industry and State College officials have discussed how this program can be increased. No formal State organization has been developed, but progress is being made. (NFA is working with the college to interpret the fertilizer response data into more meaningful economic terms.)

MONTANA—Dr. Bell of Montana State College has assured Mr. Rene Jones, the industry representative, that his State will do everything possible to further the program. A promotional train will tour the State publicizing the importance of proper fertilizer usage, along with other agricultural practices.

MISSOURI—No formal industry organization, but a very effective Extension program is being carried out to publicize fertilizer usage here.

NEVADA—The Educational Service has assumed responsibility for

promoting fertilizer usage there and several projects have been initiated to promote this program.

NEW JERSEY—A very close relationship between industry and Rutgers has existed for years. At least one annual Fertilizer Conference is held at the University and at that time projects are suggested for stepping up proper fertilizer usage in that State.

NEW YORK—Cornell has been holding very effective fertilizer conferences at the State level. Then too, their Extension Agronomists have held a number of regional conferences with fertilizer dealers. It is understood that these are well-attended. (NFA is working with Cornell on interpretation of their fertilizer response data into economic terms.)

NORTH CAROLINA: A Fertilizer Advisory Committee has been set up to consult with the University officials. Effective annual statewide meetings have been held by the University. This year a number of fertilizer dealer meetings were held in the various districts. Other projects are contemplated. (NFA is working with the State College interpreting their fertilizer response data into economic terms.)

NORTH DAKOTA—No special state-wide meetings have been held there this year. Extension Services are doing some work to publicize proper fertilizer usage.

OKLAHOMA—The Oklahoma Plant Food Association has been formally organized to work with the University in promoting proper fertilizer usage.

OHIO—No formal industry organization has been developed, but the University has held successful statewide meetings publicizing their information. Successful dealer meetings have also been held at the University. (NFA has worked successfully with Ohio State interpreting and publicizing their fertilizer response data into economic terms. A very popular bankers' brochure has already been published in cooperation with the Bankers Association.)

PENNSYLVANIA—A satisfactory industry-state college relationship has existed here for many years. Efforts are being made to step up the fertilizer research and educational program. The Extension Director has indicated an interest in employing someone to work with the bankers. (NFA has held satisfactory talks with the banker group and hopes to work out a cooperative brochure with the State College and the bankers.)

SOUTH CAROLINA—South Carolina Plant Food Educational Society is working effectively with Clemson College. Several successful projects have already been completed. Others are on the way. (NFA is working with the SCPFES and Clemson to interpret their fertilizer response data into economic terms and publish a bankers' brochure.)

TENNESSEE—Preliminary discussions have been held with the University officials but no formal state-wide meeting has been held. Successful regional and county meetings, however, are being held.

TEXAS—Discussions have been held between industry representatives and A. and M. officials in setting up a more effective program in this field.

VIRGINIA—A meeting is being held on September 16 to develop a formal program for this State. Industry and VPI officials will discuss the problem at that time. (NFA is already working with VPI interpreting their fertilizer response data.)

WEST VIRGINIA—Several committees have been set up both in experiment station and Extension Service to develop a more effective program in this field.

WISCONSIN—Under the leadership of Prof. C. J. Chapman, a very effective promotion program is constantly under way in this State.

WYOMING—In Wyoming we are advised that committees have been set up within the Experiment Station and Extension Service to develop a more effective research and educational program.

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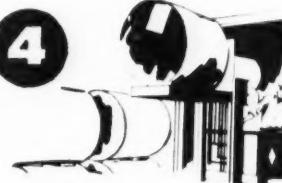
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Nitrogen Division plant at South Point during construction

NITROGEN DIVISION OFFERS 12-12-12

With the opening of their new \$5,000,000 plant at South Point, Ohio, Nitrogen Division present under the Arcadian brand a granulated 12-12-12, whose pellets are uniform in chemical analysis, chemically stabilized in manufacture to prevent caking, and screened to eliminate small particles and dust. In announcing the new product, Fred T. Techter, executive vice president said:

"Farmers will benefit economically from the high analysis . . . and from the fact that it contains no filler and nothing but high quality plant food materials."

"These features will reduce the costs of transportation, handling and application. The farmer can reduce the number of lower grades of fertilizer he has to store and handle. He will also be able to make substantial savings when a single crop application of this material can take the place of two applications of lower analysis fertilizer."

The announcement pointed out that, by the substitution of nitric for sulphuric, an annual saving of up to 88,000 tons of 100% sulphuric would result. The free-flowing characteristics of the new material have been demonstrated in airplane application and the elimination of clogging in farm distribution equipment is emphasized.

Nitrogen content is about half and half nitrate and ammonia, which offers quick-acting and long lasting forms. All of the nitrogen and potassium compounds are soluble in water, and from 30 to 45% of the

phosphoric acid is water-soluble. Over 99% of the phosphoric acid is available.

While the new fertilizer is listed as a general crop fertilizer, it is offered as ideal for corn, small grains, pastures and fruit and truck crops, and as especially suited for soils and farming methods of the States ranging from New York west to Nebraska, and from Michigan south to Kentucky. It will be marketed initially in this area, in which the new South Point plant is strategically located.

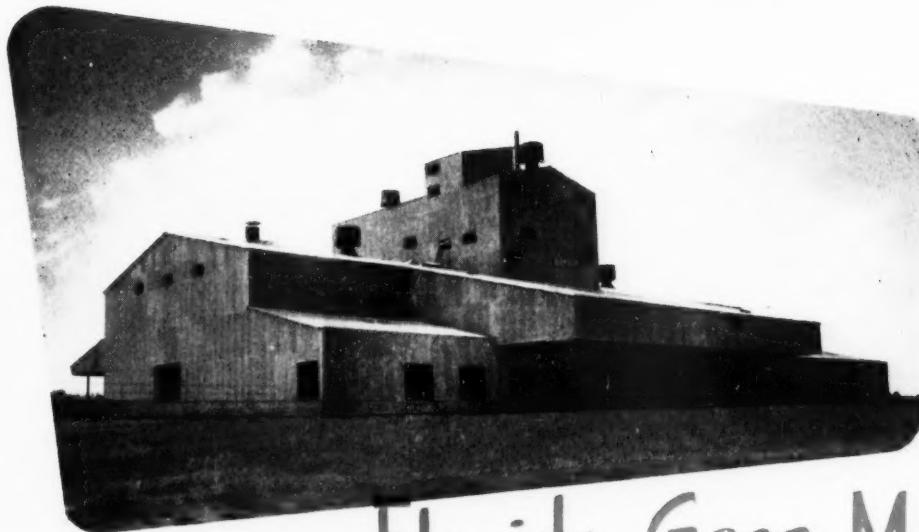
Safety men will be especially interested in the statement that Arcadian 12-12-12 will not burn with a flame. It can be partially decomposed by the heat of a flame, but the decomposition is slow and non-violent. It will propagate itself through the mass unless quenched by water.

Laboratory tests show, the bulletin continues that wood impregnated with Arcadian 12-12-12 is less flammable than untreated wood, due to the fireproofing action of some of the ingredients, such as phosphates. Owners of wooden warehouses will be interested especially in this point.

Storage recommendations point out that fire liberates brown fumes of nitrogen oxide, which are toxic, and safe practice would follow the rules laid down for other nitrate fertilizers.

Arcadian 12-12-12 will be packaged in moisture-resistant bags of 80 pounds net contents. Free-flow-

(Continued on page 49)



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To better serve its ever growing family of farmer-customers with plant foods of premium quality, the NACO FERTILIZER COMPANY selected the Sackett organization to design, construct and equip this new highly-mechanized fertilizer mixing plant at Fort Pierce, Florida.

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Superphosphate and mixed goods producers are invited to get our seasoned counsel on their expansion and modernization programs. It is available at no cost.



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Ralph B. Douglass (left), president of Smith-Douglass Company discusses the company's recent expansion at a regular meeting of company executives. Others present (left to right) were J. H. Zwemer, production manager; W. B. Copeland, vice president; D. C. Kieffer, director of research and development; W. Farley Powers, secretary; James H. Culpepper, vice president; P. T.

Smith, regional sales manager; S. L. Lott, controller and assistant treasurer; Mills W. Darden, division sales manager and director; Willard R. Ashburn, vice president and general counsel; J. V. Champion, Norfolk plant manager; and J. A. Monroe, vice president.

A YEAR OF EXPANSION FOR SMITH-DOUGLASS

The Smith-Douglass Company, Inc., long recognized as one of the nation's more progressive fertilizer and distributing organizations, can now look back upon a year in which it has enjoyed the greatest expansion since its birth more than three decades ago. Today it controls and directs the operation of eleven plants in eastern and midwestern states; a phosphate rock mine embracing some 12,500 acres, a nitrogen-fixation plant, three nitrogenous tankage plants, two large integrated fertilizer-manufacturing plants, and four fertilizer-mixing factories. About 1,425 persons are employed by the company and its division.

The first major move in the Smith-Douglass plan of expansion was the acquisition in September,

"Reprinted from the September, 1953, issue of **The Commonwealth**, the Magazine of Virginia, published by the Virginia State Chamber of Commerce."

By FRANK SULLIVAN

in "The Commonwealth"

1952, of more than 98 percent of the outstanding stock of the Coronet Phosphate Company, which owns extensive reserves of high-grade rock near Plant City, Florida. F. Eberstadt & Co., Inc., of New York, served as agents for Smith-Douglass in this and other financial projects during the past year.

Now a division of Smith-Douglass, the Coronet Phosphate Company, which was formed in 1905, supplies phosphate rock to fertilizer companies throughout the Southeast and furnishes defluorinated phosphate to manufacturers of poultry and animal feed throughout the nation. It is the only company in the United States now producing defluorinated phosphate rock, which provides mineral phosphorus for animal feed.

Soon after the phosphate company transaction was consummated, Smith-Douglass, which was incorporated under the laws of Virginia in 1921, made its first public offering of shares of common stock in November, 1952. Prior to that offering, the common stock had been privately held and was not available to outside investment interests. The 370,000 shares involved in the offering represented 40 per cent of the 924,580 shares then outstanding.

The next step in the expansion of the 33-year-old company was its merger last spring with the San Jacinto Chemical Corporation, with Smith-Douglass emerging as the surviving corporate body. It was announced at the time that San Jacinto, which had been producing anhydrous ammonia since July, 1950, would undergo a \$1.6 million expansion program designed to boost its rated capacity from eighty

to one hundred and twenty tons of anhydrous ammonia per day. This work is now under way.

The common stock of Smith-Douglass was accepted for trading on the New York Stock Exchange on June 1 of this year. This of course, made its stock more available to the American investing public. The currently outstanding 939,580 shares are widely distributed. A factor of interest to investors is that the company has never omitted a dividend.

Other developments in the company during the past year have been the establishment of a department of research and development and the first retirements because of age under the employee pension plan. Funds for this plan have been accumulating in the hands of the trustees for the past ten years at the rate of about \$300,000 a year. The plan did cover the retirement of several employees in 1951 because of illness and also provided payment of normal death benefits to employees' survivors.

Ralph B. Douglass, who joined the present company in 1927 as vice president with the late Oscar F. Smith, has been president since Mr. Smith's death in 1950. But the organization can trace its beginnings back to 1919, when Mr. Smith, while employed as general superintendent of a fertilizer plant in Norfolk, conceived the idea of specializing in the manufacture of tankage, a nitrogen-bearing fertilizer made from scrap leather, which at that time played a more important role in the industry than it does today.

Mr. Smith found a partner in Robert B. Rowland for his tankage venture. This was the nucleus of the organization which today conducts a series of carefully engineer-



Tank cars are loaded with liquid anhydrous ammonia at the San Jacinto Chemical Corporation's plant, a division of the Smith-Douglass Company near Houston, Texas.

ed operations to convert primary raw materials into fertilizer and to create its finished products from chemicals mined in the earth and drawn from the air. Mr. Rowland severed his connections with the firm in 1921, but later became associated with the operation for another period before devoting his full time to other business activities. The Smith-Rowland Company, one of the present divisions of the parent body, still bears his name.

In was in 1921 that the company, operating as the Smith Reduction Corporation, began to make mixed fertilizers so successfully that it became necessary to expand the factory every year. In anticipating future needs, Mr. Smith bought a fifty-two acre site on the Southern Branch of the Elizabeth River, near Norfolk. Upon this site was erected in 1926 the nucleus of the present plant.

During the following year, Mr. Douglass, then vice president of the Eastern Cotton Oil Company, bought an interest in the fertilizer firm and joined it as vice president. He brought to the company many years

of experience in the cotton-oil and fertilizer business and a sales ability that was to stand the company in good stead. The name was changed to that of Smith-Douglass Company.

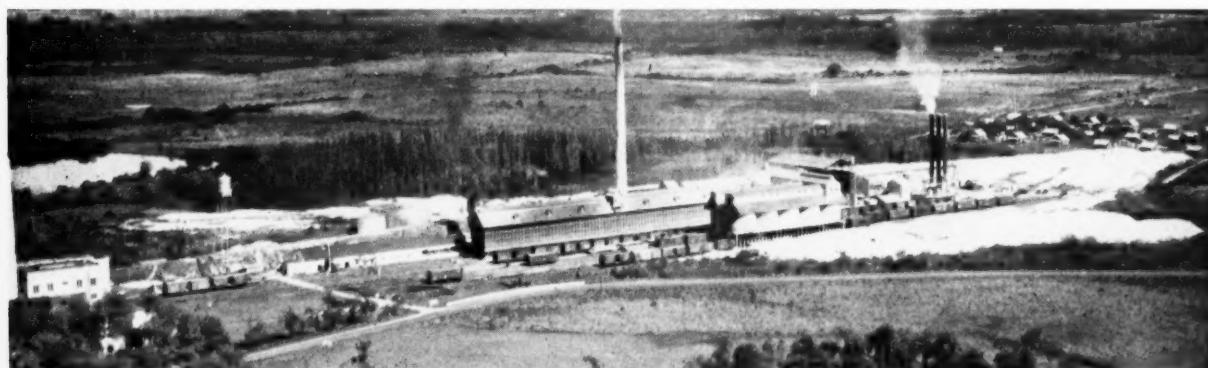
The depression did not stop the company's growth. The Norfolk plant continued to spread over the Southern Branch site. In 1929, a new plant was erected in Danville. Another plant was built in Kinston, North Carolina, in 1930.

Meanwhile, Smith-Rowland, the company's nitrogenous tankage division, felt the need for expansion and bought a plant in Granite City, Illinois, which was readily accessible to the shoe industry centered around St. Louis and its environs.

As early as 1935, the company was making superphosphate with the aid of sulphuric acid acquired on the open market. A sulphuric acid plant began operation at the Norfolk factory in 1938. Thus the program of integration was inaugurated.

The discovery by farmers of the Midwest during World War II that fertilizer would increase their yields

The defluorinated phosphate plant operated near Plant City, Florida, by the Coronet Phosphate Company, a new division of the Smith-Douglass Company. Defluorinated phosphate is used as a phosphorous supplement in animal and poultry feeds.





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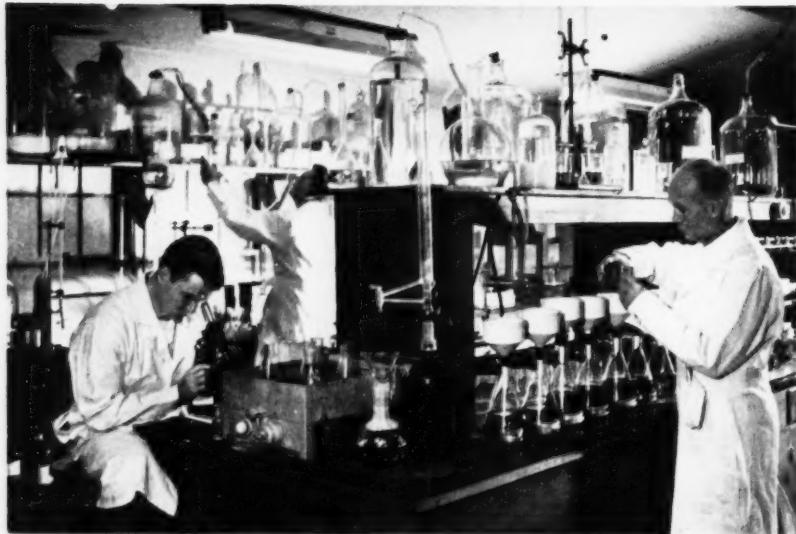
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MATHIESON



Smith-Douglass chemists at Norfolk test Smith-Douglass fertilizers for quality and analysis, an important step in the production of all of the Company's products.

at no extra cost of labor or land paved the way for the erection in 1945 of the company's dry-mixing factory at Streator, Illinois. This was followed by the construction of a superphosphate plant there. A sulfuric acid plant, which took shape in 1950 in the same location, gave Smith-Douglass its second integrated operation, and as a further step of integration, a \$500,000 phosphoric acid facility is under construction and will be in operation by 1954. Meanwhile, the consumption of fertilizer in the midwestern area has increased substantially, although southeastern states still lead the nation in the use of plant food.

In 1945, when normal construction materials were scarce, Smith-Douglass acquired several war-sur-

plus airplane hangars and assembled them in Wilmington, North Carolina, to house a mixing plant at that location. The midwestern territory was expanded in 1948 with the erection of a mixing plant at Albert Lea, Minnesota, and a third tankage plant was built at Selbyville, Delaware, in 1951.

However, the manufacturer of fertilizer had developed widely by this time into a complex chemical procedure requiring closer chemical control. The exploitation of refined and processed raw materials began to replace the use of by-product materials and animal residues.

With this transition in mind, and in accord with the emphasis that Smith-Douglass management had given integrated operations through

most of its existence, a program looking to even greater self-sufficiency was unfolded in the past year through the acquisition of the Coronet Phosphate Company and the subsequent merger with the San Jacinto Chemical Corporation.

There is little doubt that the company has other expansion plans for the future, judging from Mr. Douglass' outline of industry prospects, as he viewed them last spring in an address before the New York Society of Security Analysts.

"Because of the basic importance of agriculture," Mr. Douglass said at that time, "the commercial fertilizer industry is in an enviable position insofar as market for its products is concerned. There will be peaks and valleys of demand and consumption, but over the next twenty-five years or more, fertilizers will become more important to the welfare of our country and the volume (of production) will greatly increase."

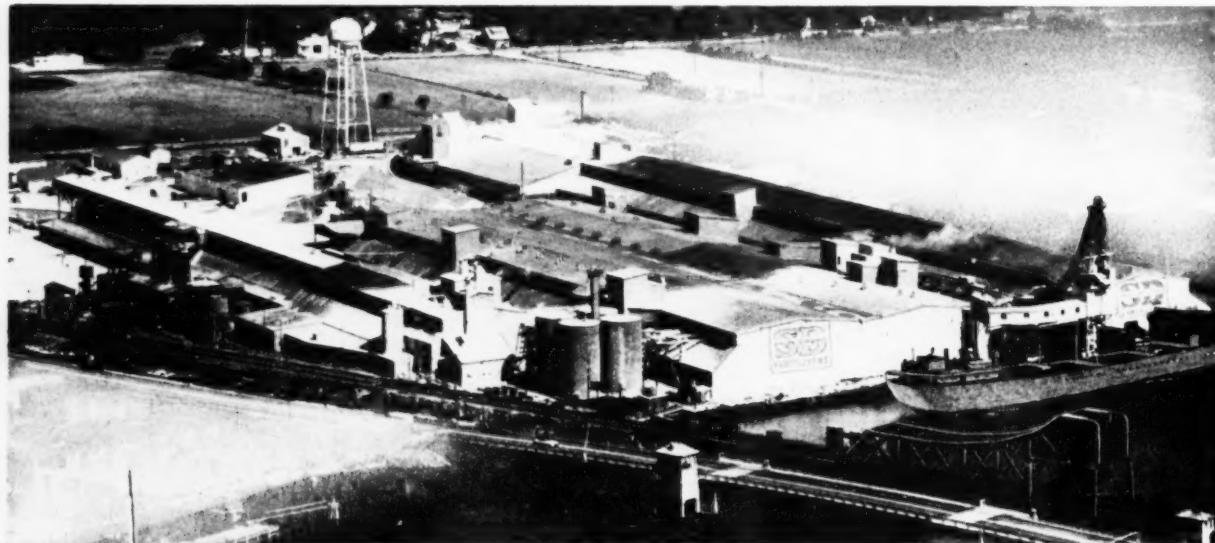
He noted four trends in the chemical fertilizer fields, as follows:

1. A growing realization on the part of farmers that fertilizer is a necessary tool in lowering the cost per unit of production and in making farming more profitable.

2. A strong trend toward higher concentration. Because of the economics of the situation, with a substantial proportion of the cost of fertilizer represented by transporta-

(Continued on page 49)

Aerial view of the company's Norfolk plant on the Southern Branch of the Elizabeth River. A thirty-five-foot channel allows materials to be received by seagoing vessels, one of which may be seen unloading phosphate rock.



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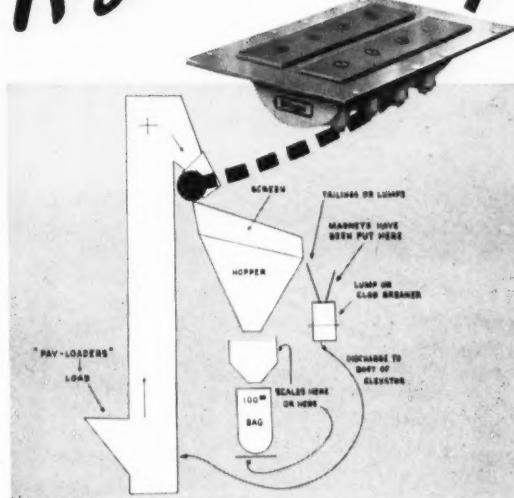
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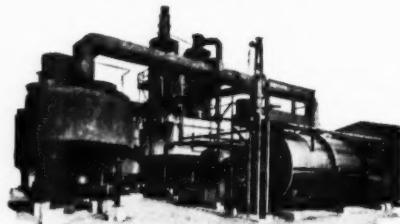


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Personals . . .

Two faces will be missed around NFA headquarters: **Mary Wallace Nelson**, secretary to **President Russell Coleman**, who on September 1 married **Henry C. Aaron**, district sales manager in Shreveport for **International Minerals and Chemicals**; and **Bill Chace**, since 1945 director of information for NFA, who has become Washington representative of **Group Attitudes Corporation**, working directly with the **National Milk Producers Federation**. His successor, **Delbert L. Rucker** is pictured here.

* * *

Dr. John R. "Dugan" Taylor, Jr., who has been APFC agronomist for nearly 8 years, and who came to them after some 3 years with **Virginia-Carolina Chemical**, plus experience in the **Alabama Experiment Station** at Auburn, resigned, effective October 15 to be sales manager of the **Grand River Chemical** division of **Deere and Company** with Tulsa, Oklahoma as headquarters.

* * *

Jack and Mrs. Rutland, we learn are soon to move to Savannah, Georgia. As our readers know, Jack resigned as General Manager of **International Minerals & Chemical**, to devote himself to his interest in **Smoky Mountains Fertilizer Company**, of which he is vice-president; **Western Carolina Phosphate Company**, of which he is president; and **Southern States Phosphate and Fertilizer Company**, of which he is vice-president in charge of sales, with Savannah as his headquarters.

"Dugan" Taylor, who has become sales manager of Deere's Grand River Chemical division, producer of nitrogen.



Lewis G. Porter, his friends in the industry will regret to learn, has taken an indefinite leave, due to illness, from his post as chief, fertilizer staff Office of Materials and Facilities, PMA, USDA. During his absence, **James N. Lowe**, assistant chief, will hold the fort for him.

Just at press time we learn
with deep regret that Lew
Porter has passed away.

Tom C. Law, Atlanta chemical consultant, well known in the industry for his work in fertilizer plants, took off his professional dignity during the Atlanta invasion of 7,000 Shriners. He is Past Imperial Potentate of the Shrine's 165 Temples, a Past Potentate of the Atlanta Yaarab Temple, and now Grand Sovereign Inspector General of Scottish Rite.

* * *

Leland D. Smith has been appointed director of transportation by **Consolidated Chemical Industries**, with Houston, Texas, as his headquarters.

* * *

Mason E. Lee, Jr., has joined **Hammond Bag and Paper Company**, and will cover Louisiana, Alabama

Lett. Delbert L. Rucker, NFA's new director of information, succeeding Bill Chace who is now with Group Attitudes Corporation. He joins the staff October 12, and will be responsible for "Fertilizer News" and press and radio contacts. He was for 12 years in information, public relations and administrative work for USDA. Right, John F. Gale with NFA since 1950, who has been made editor of "National Fertilizer Review," NFA official publication.



and Mississippi. For the past six years he has been with **Bemis Bro. Bag Co.**

* * *

S. Cottrell has been promoted to vice-president of **Mathieson's** agricultural chemicals division, with Little Rock as headquarters. He will continue to direct operations of their seven plants in Arkansas, Arizona, Texas, North Carolina and Pennsylvania, as he has done for the past year.

* * *

James F. Porter has been made manager of the Toledo plant of **Chase Bag Company**.

* * *

Thomas M. Ware, vice president in charge of the Engineering Division, **International Minerals & Chemical Corporation**, has been elected a director of **Dunlap and Associates**, it was announced by **Dr. Jack W. Dunlap**, president of the Stamford, Connecticut, industrial consulting firm.

* * *

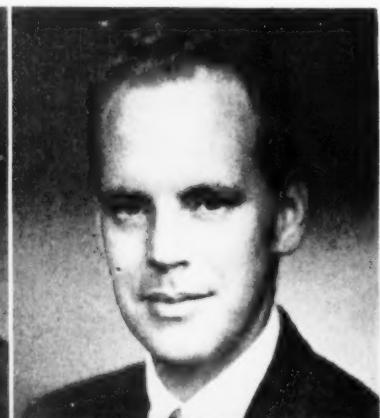
Charles D. Harless has been promoted from assistant to the position of New York district manager of **National Gypsum Company**.

* * *

R. P. Hamilton, formerly of Norfolk, Va., has been named representative in Richmond of the Plant Division of **Swift and Company**.

* * *

Trevor A. Steele has been appointed to the sales staff of **American Potash & Chemical Corporation** as regional agronomist, and will assume responsibility for the technical sales requirements of potash, ag-



ricultural borax and related products in the States of Oregon, Washington, Idaho, Montana and British Columbia. He will maintain headquarters at Salem, Ore.

* * *

Robert W. Reardon has been added to the technical sales staff of the Chemicals Department of **The Quaker Oats Company** according to Frank F. McKinney, sales manager.

* * *

C. E. (Chet) Hayward, for the past several years with the Industrial division of Purex, and Wyandotte Chemical, has been named Western division representative of **Universal Detergents, Inc.**, Long Beach, California.

* * *

William J. Haude, until recently President of the **Pittsburgh Agricultural Chemical Co.**, has been named Vice President in charge of Marketing for **Grace Chemical Company**, according to an announcement by **W. P. Gage**, the concern's President.

Mr. Haude was President of Pittsburgh Agricultural from 1948 to 1953. Before that he was Vice President in charge of sales for John Powell & Company of New York.

* * *

Donald Dunwody has been named manager of a newly created district sales office in Boston of **Monsanto Chemical Co.**'s phosphate division. He previously was district manager in New York. At the same time, Monsanto announced that **Sam F. Teague Jr.** of Birmingham will succeed Mr. Dunwody in New York, and **G. C. Davis** of Atlanta succeeds Mr. Teague. **George E. Chase**, sales correspondent at the New York of-

Left, Jack C. Bever one of the two new district representatives now working with Payloader distributors. He will travel D.C., Maryland, Virginia, West Virginia and the Carolinas. Right is Dwain Richey, whose territory embraces Arkansas, Louisiana, Oklahoma, Texas and New Mexico

fice, will transfer to the Birmingham district as resident salesman.

* * *

E. A. Kendler's retirement as Western Sales manager of **Gilman Paper Company**, of which **Kraft Bag, St. Mary's Kraft and Cellucord** are all subsidiaries, marks the first of its present executive personnel to relinquish responsibilities on attaining retirement age set by Company policy. He started with them 40 years ago. **Fletcher L. Munger**, who replaces him, as announced here last month, has been in the paper business since 1936, and resigned as sales manager of the New York general sales division of **Bemis Bro. Bag Co.** to accept the present post.

"He will be responsible to Harry C. Lawless, Vice President and Director of Sales for Gilman, on sales of all products of Gilman and subsidiaries. The Western Sales Office is in the Daily News Building, Chicago."

* * *

C. M. Wallace has been made manager of bulk sales and exports for **Summers Fertilizer**. He was formerly with **Standard Wholesale Phosphate and Acid Works** in much the same post, and is well known here and abroad.

* * *

John L. Sanders was the subject of a thumbnail history in the recent issue of "Today's Fertilizer Dealer", the **Spencer Chemical** houseorgan, which devoted that issue to John's Southeastern territory.

* * *

G. L. Hatheway, Robert B. Hobbs, W. Griffin Morrel, Frederick L. Schuster and Charles E. Wilson were elected September 24 to the Board of **Davison Chemical**.

W. J. Mullet, who has been made manager of the Orlando, Florida sales office of Chase Bag Company, with whom he has been association since 1927.



James A. Wilson, who has become production manager of International Minerals & Chemical's chemical phosphates department in Florida.



Norman E. Hathaway, who has been given a six months leave of absence as sales manager of the Davison Chemical industrial chemicals department, in order to serve as director of the chemicals and rubber division in the new agency which will replace NPA.



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With 55-56 Baume Sulphuric:

Reduce surface tension by adding UDET F to cut-back water; instantly soluble.

With Phosphoric or Nitric:

Reduce surface tension by adding UDET F directly to the acid; instantly soluble.

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- 1) Reaction between acid and rock is instantaneous.
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- 3) Reaction speeded up.
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- 6) The effects of the UDET F in the super carry over uniformly into the manufacture of mixed goods to give faster curing, softer piles and cake-resistant fertilizer.

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Around the Map

CALIFORNIA

California Spray Chemical's acquisition of the assets of **Mid-State Chemical Supply Co.** is part of an expansion program which has added 34 plants in 20 states, territories and countries to their string. Former Mid-State personnel will be retained, according to **George Wood**, Cal-Spray's district manager at Fresno. **Cliff Gay** will manage the Lindsay office, and **Louis Grabe** is the new manager at Bakersfield.

FLORIDA

Hendrix Liquid Fertilizer Co., Jay, has moved into a new building giving them 1800 square feet of floor space. **Jack Hendrix** is owner of the concern which serves four counties with anhydrous ammonia. New storage facilities are being installed.

GEORGIA

C. O. Smith Fertilizer Manufacturing Company, Moultrie, are building a plant in Douglas. Meanwhile distribution in that area will be made from the Moultrie headquarters. The new plant will cover 65,000 square feet and will employ some 75 people. Some of the raw materials will come from Moultrie when the plant is put into operation next Spring. The equipment will include **Sturdivant Acidulating units**.

KANSAS

Consumers Cooperative are making good progress with their \$15,000,000 plant at Lawrence which is scheduled to be on the line August of next year, and to produce annually 83,000 tons of ammonium nitrate, 13,200 tons of anhydrous ammonia and 13,200 tons of 40% nitrogen solutions. Distribution will be to

farmers through their local cooperatives. Local citizens are fascinated by the international flavor of the enterprise, with equipment coming from Germany, Italy, and France, as well as from several remote points in the U. S.—New York, Ohio and Pennsylvania.

KENTUCKY

Tri-State Chemical Company, headed by **John W. Manning**, are building a \$200,000 fertilizer plant at Henderson, which is slated for operation by the end of this year. It is expected to produce about 20,000 tons of bulk and bagged fertilizer annually.

MISSOURI

Monsanto has consolidated its organic chemicals division soil conditioners and agricultural and special chemicals sales groups into one department to be known as "agricultural chemicals," **John L. Hammer Jr.**, general sales manager announces. **Herbert C. Koehler** will head the newly named department, with **Charles P. Zorsch** as associate manager. **Claiborne L. Barber**, aided by **Robert R. Wangerin**, will supervise herbicides and insecticides. **James W. Starrett Jr.** will handle special chemicals sales.

NEBRASKA

Platte Valley Fertilizer Company, Fremont, has been organized with a \$50,000 authorized capital, by Paul and Kathryn Eveland.

NEW YORK

DuPont have closed down their agricultural chemicals warehousing and dust-mixing operations at Lyndonville, and have transferred **Leeland W. Hutchinson** to Sodus as superintendent of the warehouse

there. Other personnel have been offered posts at other DuPont locations. Improvement of motor transport facilities were given as the reason for the move, making it possible to serve that section of the state from one central warehouse.

OKLAHOMA

Phillips Petroleum, Bartlesville, has become the 30th corporation in American industry to hit the billion dollar assets level, and has done it in 36 years, the shortest time of any in the oil field, not having predecessor companies with large assets. It is the second youngest. **Phillips Chemical**, subsidiary, produces nitrogen and other farm chemicals.

PENNSYLVANIA

Pittsburgh Agricultural Chemical Co. has moved headquarters from New York to Pittsburgh, and having done so has dropped Pittsburgh from its name and is now known as **Agricultural Chemical Division of Pittsburgh Coke & Chemical Co.**

Personnel changes announced at the same time include the appointment of **Herbert F. Tomasek** as manager of the division, and the appointment of **W. Scott James** to succeed him as sales manager. James formerly was technical sales director. Also, **Dr. J. B. Skaptason** has been appointed division director, new products development.

Pittsburgh Coke & Chemical started to make "Pittsburgh" insecticides, herbicides, and other agricultural chemicals five years ago.

TEXAS

Texas Gulf Sulphur has been having neighbor trouble, too, and is spending more than \$100,000 to counteract fumes from their oil wells at Spindletop. The residents kicked about hydrogen sulfide fumes, which every chemical student makes at least once to disconcert his teachers and fellow students.

* * *

Southern Fertilizer & Chemical have bought out the interests of **Malcolm L. Wilson**, who has been distributing anhydrous ammonia in the McKinney area for several years. **Dugan Grain & Feed Co.** have bought the Wilson storage

tanks and equipment and have taken over the local dealership.

* * *

Gro-Lite Co. Houston, is marketing a new growing medium of that name which is made of perlite with nitrogen added. It absorbs 16 times its volume of water and is offered as a soil conditioner.

WASHINGTON

Tidewater Packing Co. Bellingham has arranged for storage facilities and distribution connections to produce daily 1200 daily gallons of fish fertilizer, in cans. **Richard Simmons**, a partner, says tests have produced satisfying results with the liquid fish fertilizer.

12-12-12

(Continued from page 34)

ing, it can be stacked, and a ton takes up only 7 square feet of floor space when stacked 15 bags high to a convenient 5-foot height.

The process is described as follows in the general bulletin:

This fertilizer is manufactured by a continuous chemical process pioneered by Nitrogen Division. In the process ground phosphate rock is continuously mixed with nitric, phosphoric and sulphuric acids. After preliminary digestion, these acids are neutralized with anhydrous ammonia to produce well-known fertilizer salts such as ammonium nitrate, ammonium phosphate, ammonium sulphate, etc. At certain points in the processing, potash salts are added and become chemically integrated with the other nutrients to produce a chemically stable and highly available mixture of essential plant foods. The product is then dried to about one per cent moisture, screened, and cooled before going to storage. Over-sized particles are removed, remilled and returned to the process along with the under-sized particles for further refinishing. The final granulated particles are of a size such that all will pass through an 8-mesh screen and none will pass a 30-mesh screen.

Smith-Douglass

(Continued from page 40)

tion and packaging, this trend is being greatly accelerated.

3. Growing use of pelletized fertilizer, or granulated forms, in place of the older, pulverized forms. This trend indicates that capital expenditures will be necessary for new and different types of equipment.

4. A trend toward industry integration, with more companies controlling their sources of raw materials and carrying out all manufacturing operations in the mixed fertilizer field.

Mr. Douglass is also treasurer of the company and a member of the board of directors. The four vice presidents are: W. R. Ashburn, W. B. Copeland, J. A. Monroe, and J. H. Culpepper. The vice presidents also are members of the board, together with R. R. Charles, M. W. Darden, J. C. Jett, L. J. Kellam, and W. F. Powers, who is also secretary of the company. S. L. Lott is controller and assistant treasurer.

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3. FOOD CONTROL—supplies uniform amount of plant food at desirable rates.

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offers 3 way Control

Davison's Granulated Superphosphate with 3-way control can mean added sales for you!

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For added sales points be sure to get *Davison's Granulated Superphosphate with the 3-way control!*

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Foliage Feeding A REVIEW OF DATA AND OBSERVATIONS



John M. Frederick, Plant Manager of the Florida East Coast Fertilizer Co., Homestead, Florida, author of this report on foliar feeding.

GENERAL STATEMENT

The practice of applying water soluble and some water insoluble fertilizers to leaves and aerial plant parts for plant feeding purposes has become widespread and satisfactory. Florida growers have been applying foliage nutritional sprays containing water insoluble neutral Copper & Zinc, Sulfate forms of Manganese and Iron and to a lesser extent Magnesium Sulfate, Borax and Molybdenum. The use of secondary elements to foliage-wise came primarily through the research work of Florida Experiment Station scientists and Florida farmers and growers were quick to utilize the information. While we do not question the effective use of secondary elements for foliage spray, there is doubt in the minds of many that Nitrogen, Phosphate, and Potassium are assimilable through foliage since it is the very nature of plants to feed through their roots. The writer will, therefore, present the case for NPK foliage feeding and will draw freely from published data and personal correspondence with research men, growers and nurserymen engaged in this work.

ADVANTAGES

Since the cost of highly refined,

It is the writer's considered opinion that there is no sales contest between water soluble "Foliage fed" fertilizers and regular commercial fertilizers.

The degree of plant food assimilation through aerial plant parts can only finally be a maximum limited portion of the total NPK requirements. Obviously plants must be fed for the most part through their roots as nature will still require. The unit cost on a comparative NPK Basis is about five times as much for water soluble fertilizers as for competitive commercial grades. Water soluble fertilizers can, however, supplement commercial fertilizers toward the goal that greater acre production efficiency may be attained.

The two systems of plant food assimilations i.e. the foliage fed system and the soil root fed system complement each other and one cannot do the other's job—each does its own.

quickly soluble N P & K materials is several times that of regular grades used in mixed fertilizers, there must be several advantages that more than compensate for the additional cost. The primary advantage is in the fact that the soluble fertilizer dumped into power spray equipment simply gets a free ride in a most ideal spreader system. There the cost of application, where the grower is spraying specifically for insect and disease control, is practically nil. A second advantage is that one can add definite amounts and get a more accurate control of plant food intake. Thirdly foliage feeding eliminates in large part fixation and difficulties associated with unfavorable p. H. Also a greater efficiency of N P & K intake may be accomplished per unit used. Plants may be able to assimilate through their leaves the primary plant foods when soils are too cold, too dry, water logged or leached. Any of these four factors can upset a growing plant, however, they may be corrected to an economic degree at critical times of plant growth by foliar sprays.

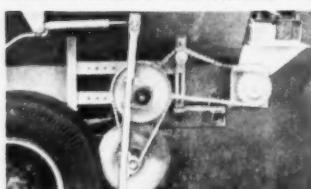
At this point it may be well to clarify the fact that the various types of soluble fertilizers actually are used in three distinct ways. Firstly they are used as a strict foliage fertilizer when applied to plants' foliage in a water solution to the point of wetting. This is not to be confused with the use of these materials in irrigation water. Their

use in irrigation water such as in nurseries, green houses, on lawns etc., is a second use and in most cases the soluble fertilizers are washed off the plants' foliage during the continuation of irrigation. A third use is in their employment as a starter solution for seedbeds and with plants that are to be transplanted to the field.

EFFECT OF FOLIAR APPLICATION TO VEGETABLE CROPS

Tomato growers of Dade County (Florida) began to utilize Urea (Nu-Green) for foliage spray in 1949 and since that time it has virtually become standard practice particularly on the Grothen types to apply 5 pounds of NuGreen per 100 gallons of water per acre. The maximum amount of NuGreen that tomatoes will tolerate is 7½ pounds per acre and if 7½ pounds is used 150 gallons of water should be used per acre. Dade County growers have actually applied over 180 pounds of NuGreen per acre in conjunction with their spray programs and have had substantial yield increases. Where a rather large amount of Nitrogen is sprayed on tomatoes to force growth, it is well to increase the Potash in fertilizer 1½ to twice the amount of foliar Nitrogen applied so as to have even growth and maximum production. In the presence of adequate available soil nitrogen it is doubtful that nitrogen foliage sprays on tomatoes will do any good at all—in fact, if Phosphorous and Potash are

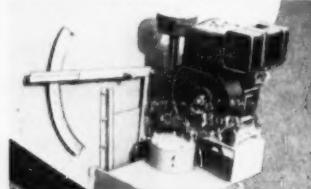
Check these Advance Features:



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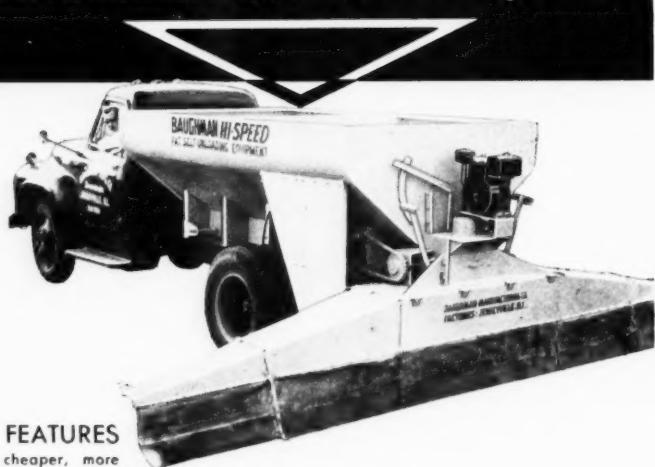
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at an extreme low level, foliage nitrogen may accentuate Phosphorous and Potash deficiencies. This also may hold true for other plants. At this point we quote from a recent article by Dr. J. B. Hester and (1) R. L. Isaacs of the Department of Agricultural Research of the Campbell Soup Company: "It has been reported in the literature that plant nutrients (Nitrogen, Phosphorous, Potassium and particularly Magnesium) are absorbed through the leaves and stems of plants. This is unquestionably true. The authors have observed that Nitrogen and Potassium also leach from the leaves of the tomato plant during excessive rainfall; it is not a one-way phenomenon. Investigations were initiated to ascertain if tomato plants grown on soils poorly supplied with nutrients and showing both Phosphorous and Nitrogen deficiency could absorb plant nutrients through the leaves. Using a Tifton sandy loam with an

acid soil reaction and depleted Phosphorous and Potash condition, tomato plants grown without fertilizer in a row were sprayed with complete mixtures (of soluble fertilizers) as well as Urea alone. The plants absorbed the plant nutrients but sacrificed it to the soil. It is obvious that there is a competition between the soil and the plants for certain plant nutrients, particularly Phosphates. The Phosphates did not increase the growth or Phosphate content of the sprayed plants. The soil must be supplied with Phosphate materials if the plant is to be able to utilize the Nitrogen and Potash in the form of spray material. Perhaps much of the literature on the subject of the ready absorption of the nutrients, particularly Phosphate is based on sand culture work, where there is no competition between the plant and soil. The use of Nu-Green on carrots has been quite successful and Hester and

Isaacs say that 30 pounds per 100 gallons of water are safe. Soluble foliage fertilizers are now being used commonly on practically all truck and vegetable crops in South Florida and it appears that they are vegetable crops in South Florida and it appears that they are compatible with most spray pesticides. If there is any incompatibility it has not been observed although every conceivable mixture of pesticide, we hazard, has probably been included with the soluble N P K chemicals in South Florida truck and grove spray applications.

ABSORPTION OF NUTRIENTS BY STEMS AND BRANCHES OF WOODY PLANTS

Research men at Michigan State College whose work in this instance was supported by a grant of the Biological and Medical Division of the Atomic Energy Commission made some interesting discoveries relative to plant nutrient movement

within plant tissue. By using radio active isotopes they tagged Nitrogen, Phosphorous and Potassium each individually. Thus each element was tagged or "branded" so that even though the element is unseen within the plant tissue, a Geiger counter could see it and even determine exact location and relative density just as surely as a doctor with X-ray or fluoroscope can see a coin swallowed by a child. In the work at Michigan State College, radio-active Potassium Carbonate was applied (and we quote) "in a six inch band of cotton gauze around dormant branches of bearing apple trees in midwinter (and) was detected 24 hours later in both Phloem and Xylem 18" above the point of application and 18" below, although the air temperature was below freezing during the period and reached a minimum of 3 degrees Fahrenheit. Radio (active) Potassium was detected likewise in branches rising vertically from horizontal branches to which it was applied." Similar results were obtained with peach trees.

In another experiment using somewhat similar band treatment on two year old potted peach trees 'tagged' Phosphorous had moved in 28 hours to the stems and root tips. Then finally in a test to measure Nitrogen intake and movement, tagged Urea was applied to the branches of apple, peach and cherry trees. The Nitrogen was assimilated through the bark. The intake was in proportion to the amount of leaves on the trees. The more present the greater the intake. To quote directly from the research paper, "It would appear from these data that so-called 'foliage feeding' must take into consideration other portions of the plant such as trunk, branches, and shoots as well as foliage."

VEGETABLE RESPONSES

Dr. Wittwer at Michigan also observed Phosphorous movement in vegetables. O Phosphoric (liquid) Acid sprayed on a tomato leaf is rapidly absorbed and simultaneously moves to the growing tip and

down to root tips. This movement has been observed on Squash, Beans, Cucumbers, Corn, Strawberries and Cabbage. Wittwer also states that while only small quantities of the total plant food needs of a plant may be utilized in sprays, we have within this limitation the most efficient fertilizer placement yet conceived. Utilization is high up to 90%, and both sides of the leaf have absorptive qualities along with other plant parts. Using developing tomato fruit as an index for Phosphorous requirement and absorption, it was found that 25% of the total Phosphorous requirement of the fruit of the first cluster could be satisfied by a single spray applied at time of fruit setting. When this spray was followed by three additional sprays at five day intervals 75% of the total Phosphorous in the developing fruit was derived from the accumulated amounts sprayed on the leaves. This Phosphorous entered the fruit from the foliage in one hour. Generally speaking, Phosphorous deficient plants show the deficiency first in

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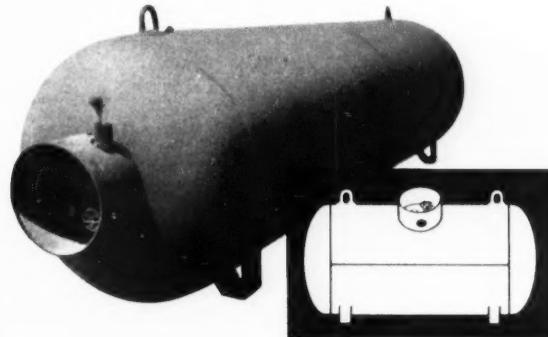


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older, lower leaves. This is because Phosphorous in old leaves migrates to the growing tips where without Phosphorous no new growth can occur. Potash is usually evenly distributed throughout plant tissue and it is generally agreed that any good soluble form of Potash is suitable for foliage feeding. There is, however, no evidence, as far as the writer can tell as to foliage tolerance to Muriate of Potash (Potassium Chloride). It has been found that foliage treatment is more effective if the material is applied at night when the pores of the leaves are open. This helps to achieve more rapid penetration. Although night application is impractical, this is significant in that early morning or late evening spraying will be more effective.

CONCLUSION

The work at Michigan State College with radio isotopes suggests that all chemicals and substances absorbed by plant roots can also be absorbed by leaves. The rapid acceptance of the practice of N P K foliage feeding by growers, nurserymen, etc., has been ahead of sub-



The new Baughman Model K-4 fertilizer spreaders have introduced many new features among the most important of which is the Baughman exclusive fifth wheel drive. Another is auxiliary power for the distributor. An illustrated brochure is available from the manufacturer. Write the Baughman Manufacturing Co., Jerseyville, Illinois, and ask for Bulletin #A-378.

stantiating experimental data. It appears that foliage feeding will become a permanent part of food and fiber production and offers a greater plant food efficiency and greater production per plant.

LITERATURE CITED

- (1) R. L. Isaacs, Jr., and J. B.

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NAC DISCUSSES FERTILIZER - PESTICIDE MIXTURES

To mix or not to mix, that was the question which was threshed out most thoroughly at the convention last month of the National Agricultural Chemicals Association. Whether it be better for farmer, dealer, fertilizer manufacturer to blend together the food that feeds the roots, with the chemical that protects those roots from their insect enemies . . . or whether it be a confusion and a snare. The insecticide people talked the thing out frankly and bluntly, taking the favorable with the unfavorable; the scallions along with the orchids.

It was a big convention, celebrating 20 years of service to one of the world's most spectacularly risen industries, and it met at a time when, as retiring president Arthur W. Mohr put it: profits in the pesticides field have vanished while those in the chemical industry as a whole show substantial gains. Mr. Mohr, who is president of the California Spray Chemical Corporation, Richmond, California, explained that overproduction had brought about drastic price reductions, which have been in effect through 1953.

A total of \$6,990,680 of product liability claims have been reported, of which \$5,242,000 are still outstanding, Mr. Mohr said. "The ratio of liability to profits compared with the chemical industry as a whole is out of all proportion."

He reported 1953 demand and use as excellent, but warned that the over-supply situation will be aggravated in 1954, with "little chance of betterment until some of the excess capacity is converted to manufacture of other chemicals with a better profit potential . . . that supply and demand come into better balance."

On the other hand, Dr. George L. McNew, Boyce Thompson Institute for Plant Research, Yonkers, New York, said "More plant diseases are being controlled better with less damage to the crop or hazard to the spray operation and

consumer than ever before." He stated that American farmers are using about half a billion pounds of fungicides this year to control plant diseases that cause a loss of about two billion dollars annually to their crops. "The farmers could well afford to pay well over a hundred million dollars for such protection of their investment in crop culture" he said. He mentioned the use of antibiotics as therapeutics rather than surface protectants and said that some hard to control plant diseases are responding to the use of antibiotics such as streptomycin and terramycin, and felt that there is every reason to believe the antibiotics will eventually be registered for use on crops.

NFA vice-president, W. R. Allstetter, presented an outline of the promotional activities of NFA, including the state-level data (examples published recently from Pacific Northwest meeting and in this issue as presented to South Carolina society) which shows the farmer and his influencing factors what he could do if he would follow the College recommendations.

This program, he pointed out, was instituted when it became apparent that a need existed to convince farmers that fertilized fields pay better dividends even when prices are dropping.

FERTILIZER-PESTICIDE MIXTURES PANEL

But to the fertilizer manufacturer, the most vital part of the whole program—and the one to which we shall devote the major portion of our report—was the panel which frankly discussed the pros and cons of mixing fertilizer and pesticides.

Here are highlights of the five papers presented:



Dr. L. G. Utter



C. T. Harding

The subject of merchandising mixtures of fertilizer and pesticides is much under discussion in our industry, among the agricultural authorities of various states, by dealers and by farmers. Obviously it is to the interest of the pesticide industry to achieve such distribution. But they themselves brought out the disadvantages along with the advantages by inviting a panel of five authorities, presided over by **L. Gordon Utter**, Diamond Alkali Organic Chemicals Division, who is chairman of the association's technical advisory committee.

Charles L. Harding, General Manager of the Virginia-Carolina fertilizer division:

Mr. Chairman, members of the panel, members of the N.A.C.A., and guests.

The subject assigned to me this morning is one about which a lot has been said but about which not much is known from an experience standpoint. Be that as it may, my intention is to try to point out some of the advantages, if any, and disadvantages as we see them today in the fertilizer industry, inherent in the admixture of pesticides with fertilizers.



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Some farmers are experimenting with fertilizer-pesticide mixtures; our plants have made numerous batches of varying mixtures containing Chlordane, Aldrin, DDT, and others. Most of these tests have been made in Florida, South Carolina, and Virginia, with the permission of the State authorities; however, we have never listed any of these mixtures for sale or recommended them to our trade. The results in all cases that I have followed have been satisfactory.

Let's start with the advantages—and again let me say, if any,

(1) **The primary advantage to the farmer is his ability to place both the insecticide and fertilizer in the field with one application.** This eliminates handling the insecticides and applying them in a separate operation; it also eliminates the necessary equipment for such application.

(2) **It reduces the danger of contamination of other farm supplies** that may be stored in the farmer's barn or storehouse.

(3) **The farmer feels that he is get-**

ting a more even distribution when he drills in a fertilizer pesticide mixture.

(4) **Reduced danger to the user** of the pesticide as compared with the handling of concentrated poisons.

There are possibly a number of other advantages that could be claimed by the farmer.

As we see this situation, **there are no advantages from the fertilizer industry standpoint.**

There are, however, many disadvantages from the fertilizer industry's point of view.

(1) The mixing of fertilizers and the mixing of insecticides is so different that **few, if any, fertilizer plants are equipped properly to do this work.**

(2) The time cycle required for proper mixing of insecticides with fertilizer **would seriously affect the service that the industry is now giving the trade.**

(3) **The multiplicity of grades** that would naturally follow the practice of incorporating odd amounts of

these insecticide materials into the number of grades we now offer **would present the greatest storage problem imaginable.**

(4) The fact that most of the insecticide materials required are toxic to human beings would present several problems. Additional sanitary facilities for shower baths, etc., would have to be made available. Special supervisory personnel would have to be trained in the proper handling of these materials.

(5) Unless special equipment and facilities are installed in the average fertilizer plant of today, **the question of meeting the State requirements on analysis would be next to impossible.** On several of our mixtures where great care, time, and strict supervision were practiced, we were only able to stay within the tolerance allowed by one State. Even though we knew the weights were correct and the mixtures made as complete as we thought possible with fertilizer equipment, never did we get the full guaranteed analysis from either

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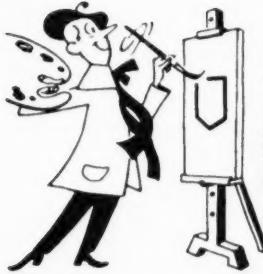
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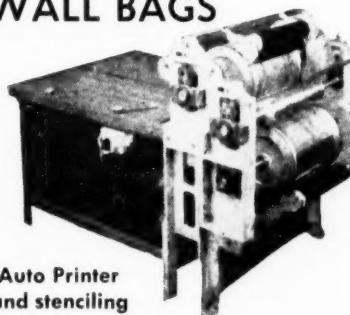


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our laboratory or the State laboratory.

(6) We are told by those who know insecticides that mixing these materials in a base that carries temperatures of 130 degrees to 160 degrees F., or higher at times, is not a good practice. This being true, a

base of odd analysis is required in each grade, to which the pesticide material must be mixed at time of shipment to properly comply with the guarantee. To make these mixtures as they are called for throughout the day would reduce our daily shipping capacity to a point where

our customers could not be properly supplied in time for their needs.

(7) The cost of this slow intimate mixing would, in my opinion, eliminate the advantages the farmer might gain by distributing his fertilizer and insecticides in one operation.

(8) Considering the cost involved if a farmer had several bags of these mixtures more than was actually needed for a given crop, he could not afford to use them on other crops, whereas today many popular grades of commercial fertilizer can be and are applied to a number of crops throughout the entire planting season in several areas.

(9) In order to properly handle fertilizer-pesticide mixtures, a plant should be designed for such a business, with proper mixing facilities, proper safety equipment, and proper shipping machines. It should be separated from the main fertilizer plant to insure that no contamination would occur and that those employees not immediately engaged in this work would not be exposed to the dust and fumes from these materials.

(10) Due to the rapid progress of your industry, in the way of new and better products, what assurance does the fertilizer industry have that goods made up containing varying quantities of these materials that are not sold in a given year will be saleable in the next season? With this fact always staring us in the face, we cannot afford to mix goods containing these materials except on specific order, with the complete understanding that none can be returned.

There are many other objections to such a practice and it is our opinion, and certainly the opinion of quite a number of others in the fertilizer industry, that the farmer should employ some means of applying his insecticides other than the fertilizer-pesticide route.

I sincerely hope that a free and frank discussion will follow because I am sure there are many questions in the minds of all of us regarding such a practice.

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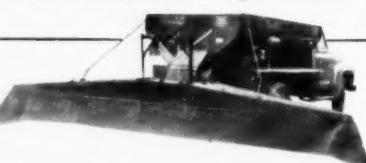
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Dr. C. C. Compton

On the other hand, here are some of the remarks made by **Dr. C. C. Compton**, Julius Hyman Division, Shell Chemical:

This morning I am going to depart from the subject to the extent of limiting my remarks to the use of insecticides in fertilizer. At the present stage of development **pesticides is a too inclusive term**. Sufficient research has been done, however, to talk intelligently about insecticides in fertilizers.

The interest in insecticide-fertilizer mixtures came as a result of logical deductions. When we began to develop insecticidal chemicals that were effective and economical for use in controlling soil inhabiting insects it was natural to look into various methods of depositing the insecticide where it would be effective. **Fertilizer has been applied to soils for many years. And where has it been put? Right where the plant roots could make the best use of the plant foods in the fertilizer.** Where are the insects which are so destructive? **Right where the plant roots are found.** Now if we are to apply fertilizers in situ for easy access by plant roots and then apply an insecticide to kill the insects which feed on the roots where fertilizers are found, it is only logical to apply insecticide-fertilizer mixtures.

This morning we are interested in what insecticide-fertilizer mixtures mean to the entomologist, the farmer, the insecticide manufacturer, the fertilizer manufacturer, the equipment manufacturer and the nation.

Entomologists have conducted extensive research in this field and favor soil applications of insecticides in fertilizer. **Insecticide-fertilizer combinations have proven highly effective** in controlling major

By DR. C. C. COMPTON, Julius Hyman Division,
Shell Chemical Corporation, Denver, Colorado

pests and since the farmer is now familiar with handling fertilizer distributing equipment he has little new to learn. Entomologists are constantly seeking the most economical methods of insect control not only from the standpoint of insecticide costs but also from the standpoint of application costs. **Where insecticide - fertilizer combinations are used the application costs are no greater for both the insecticide and the fertilizer than they are for the fertilizer alone.** No special or additional equipment is required. **This economy in application is not accomplished at the expense of the fertilizer manufacturer** as we will presently see but simply eliminates an unnecessary application expense for the farmer.

The farmer readily accepts the idea of controlling insects in the soil by the application of insecticides especially if the insecticide can be applied along with the fertilizer. **He does not have suitable equipment in most cases to apply insecticides** as they should be applied. Conventional spraying equipment must be altered for most soil applications and conventional dusting equipment is not at all suited for making soil applications. **He does not look with favor on the prospect of buying special equipment.** He welcomes the idea of applying insecticide - fertilizer combinations both from the standpoint of ease of operation as well as the economy of application.

There is no secret about the interest insecticide manufacturers and formulators have in insecticide-fertilizer combinations. **They afford a new market of great potentialities.** The economy of applying soil insecticides along with fertilizers will greatly expand the market for soil insecticides.

The manufacturer of insecticidal chemicals must be in a position to assure the fertilizer manufacturer and the farmer that the addition of insecticidal chemicals to the fertilizer **will not result in phytotoxic or toxic residue hazards** and **will not adversely affect the flavor of**

crops grown in treated soil. All parties concerned will want to be sure that the insecticide-fertilizer mixtures are **uniform in composition** to allow uniform application of both insecticide and fertilizer when the mixture is applied to the soil.

It seems to me the fertilizer manufacturer stands to be the big gainer in this new approach to insect control. Addition of insecticides to fertilizers offers a means of increasing fertilizer consumption for what gaineth a farmer or fertilizer manufacturer if the farmer applies fertilizers and insects destroy the plant root system or so damage it that the plant cannot make use of the plant foods supplied by the fertilizer?

Present indications are that soil application of insecticides will increase yields as much or more than fertilizer applications. This increase is additive. **Equipment manufacturers can look forward to greater use of fertilizer distributing equipment.** Farmers can afford to purchase equipment if they can double their profits over the use of fertilizer alone.



Dr. M. D. Farrar

Dr. M. D. Farrar, Dean of Agriculture, Clemson (S. C.) Agricultural College, approaches the problem from the agronomist's point of view. Reciting the many physical application advantages, he points out that the farmer is not interested in any operation that will not yield a return on his labor and investment. And that brings him to his discussion of pesticide-fertilizer mixtures:

The use of fertilizers has become a standard practice in most farm operations. Machines are available to apply fertilizer in almost every desirable manner. It is then almost

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a logical assumption that if something is to be applied to the soil why not follow the procedures used for fertilizers.

The bulk of fertilizers applied per acre is rather large. Relatively simple fertilizer machines are in common use. The amount of pesticide required per acre is relatively small and essentially no satisfactory machines are available for distributing a pesticide.

Where pesticides and fertilizers can be applied together a single operation may do the job. Where the fertilizer is applied in a narrow band, the pesticide can not perform to its maximum efficiency. Fortunately, most pesticides are slightly volatile and there is apparently some movement of the toxic portions of the chemicals from the point of placement in the soil.

Where pesticide-fertilizer mixtures are broadcast and worked into the soil by machines they are extremely satisfactory.

The examples are too numerous to raise the question of the efficiency of the new chemicals as pesticides in the soil. The time is not too far distant when recommendations can be pretty well standardized.

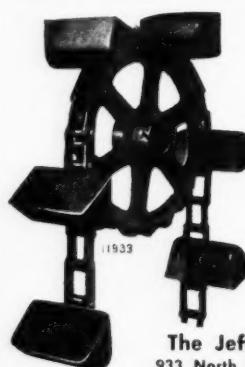
The granular type insecticide may to a limited extent provide a means of application of pesticides without fertilizers. They are now available in a wide range of concentrations suitable to almost every requirement. Physically they handle much like fertilizers and may be applied either alone or as a mixture with fertilizers.

Granular insecticides provide a medium of purchase whereby a farmer can buy a pesticide under a label. Purchasing the pesticide in this manner assures a full value, as compared to an item of uncertainty where the pesticide is mixed with fertilizers.

The problem of labeling and testing pesticide-fertilizer mixtures is

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confusing. There are many ways of handling the problem. None are completely satisfactory.

A study of the manufacture of these mixtures will help to solve some of the problems. Chemically and physically the materials are reasonably compatible. The procedure for uniformly mixing a small volume of pesticide with a large volume of fertilizer has not been satisfactorily established.

The present methods appear to be satisfactory when based on results on the farm. Most producers have been well satisfied with the results obtained following the use of pesticide-fertilizer mixtures. "Control wise," however, much work needs to be done in order to insure a uniform product that will be satisfactory to both the manufacturer and the producer.

BHC: Not recommended as a soil insecticide because of the recognized off-flavor in many crops. Amounts of 50 pounds per acre of

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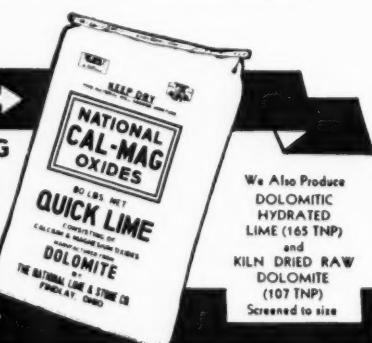
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crude BHC will retard growth of some crops. Cotton is very tolerant to this amount. Soil injured by BHC will grow a normal crop after one year. Surface treatments disappear more rapidly than when the chemical is mixed with the soil. High amounts will promote the growth of nut grass.

DDT: An excellent soil insecticide for certain uses. Remains active for about 5 years in certain soils. Apparently broken down rapidly in soils high in iron and aluminum. Very useful for soil pests of lawns and pastures, i.e., white grubs, Japanese beetle, Asiatic garden beetle, white fringed beetle. Two pounds per acre will control many pests without injury to plants. Should be avoided because of retarded growth in some crops.

Chlordane: Widely used as a soil insecticide especially in fertilizer mixtures. Has a fairly high vapor pressure, thus giving control at some distance from point of application. When used at 1-4 pounds

per acre it will kill wire-worms, corn rootworms, seed corn maggot and many other insects. This chemical will probably gradually be replaced by heptachlor, aldrin, and dieldrin.

Heptachlor: A chemical related to chlordane but with many improved characteristics. It has somewhat lower vapor pressure, will last longer in the soil and give control at a reduced dosage compared with chlordane.

Useful in fertilizer mixtures at from 1 to 2 pounds per acre. It will control wireworms, corn rootworms, white grubs, green June beetles, ants, and many other insects. Does not injure crops even at excessive dosages.

Toxaphene: Probably the least understood in characteristics of the modern insecticides. Apparently gives excellent results on peanuts, sweet potatoes and many pasture pests. More pounds per acre are required but results are good. Breaks down rapidly in the soil. Does not

cause off-flavors at recommended dosages. Cattle are very tolerant to toxaphene but fish are sensitive to 1 part in 5 million parts of water.

Aldrin and Isodrin: Closely related with similar properties. An excellent insecticide for use in the soil. They have a high vapor pressure which gives a kill at great distance from the point of application. Gives good control of wireworms, mole, crickets, ants, corn rootworms, sand wireworms, and many other pests. Use at $\frac{1}{2}$ to 2 pounds per acre in fertilizer mixtures. Will last only for about 1 year. No injury to plants at excessive dosages.

Dieldrin and Endrin: Closely related but with similar properties. Very toxic to insects where they contact the chemicals. Rather low vapor pressure. Application will last up to 5 years with little loss in insect toxicity. Probably ranks next to DDT in sterility in the soil.

Effective at a very low dosage when thoroughly mixed in the soil.

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Useful at $\frac{1}{2}$ -2 pounds per acre in fertilizer mixtures. Will control most soil insects, particularly in the beetle group. Most effective against the larvae of the white fringed beetle. Will not injure crops at excessive dosages.

Parathion: An effective insecticide for use on soil under certain conditions. It should not be used with fertilizer mixtures.

The chemical is extremely toxic to all insect life at relatively low levels. From $\frac{1}{2}$ to 1 pound per acre gives a high kill of green June beetle larvae within hours. Does not last more than a few weeks after application. **Note:** There are several phosphate type insecticides now on the market that are perhaps superior to parathion for use on soil. These will need much additional testing.

Granular Formulations: All of these chemical insecticides mentioned are now available as granular formulations. The physical character of these mixtures make them easy to mix with fertilizers. The formulations vary between 2 per cent to 50 per cent in concentration of technical insecticide.

Fertilizer - Insecticide Mixtures: These are attractive to farmers because of the ease with which they can be applied with conventional equipment.

Labeling and registration present many problems. Analysis is rather difficult for the insecticide but methods are available.

Routine sampling of mixtures would indicate that formulators will

have to improve their processes for mixing.

Data to date has shown a very variable analysis which would indicate a poor mixture of the fertilizer and the insecticide.

Since the amount of insecticide is so small a premix of the insecticide will probably be necessary in order to develop a uniform product.



R. C. Berry

Rodney C. Berry. Virginia State Chemist, devoted his time to a discussion of the point of view of the control authorities:

I have been asked to discuss the laws affecting the sale and distribution of fertilizer-pesticide mixtures. Broadly speaking a fertilizer is a substance for promoting plant growth and a pesticide is a substance for mitigating or killing pests. **Both substances are regulated by separate laws in most of the states. Major differences in these laws are being eliminated and we are approaching uniform enforcement.**

Farmers are fairly well informed about fertilizers, and **few farmers are apt to injure themselves or crops through their use or misuse of fertilizer.** As fertilizer is not a highly toxic substance, laws regulating the labeling, distribution and responsibility of the manufacturer **are**

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not as strict as pesticide laws.

Pesticides are regulated by both federal and state laws and most of the laws have been enacted or amended during the past ten years. Many of the pesticides are highly toxic and for public protection **necessarily require strict regulations regarding distribution.** Directions for use and warning against misuse must be given.

Under most laws, the manufacturer is held responsible if the insecticide, fungicide or herbicide when used as directed **or in accordance with commonly recognized safe practice,** shall be injurious to living man or other vertebrate animal or vegetation to which it is applied, or to the person applying such economic poison, except pests and weeds. **No comparative responsibility to my knowledge appears in any Fertilizer Law.** Many other provisions of Pesticide Laws could be cited in contrast to Fertilizer Laws.

Under the Federal Insecticide Act the pesticide is the **active ingredient** and the fertilizer is the diluent or **inactive ingredient** and **such mixtures passing in interstate commerce must be registered.**

I have recently reviewed the State Fertilizer and Pesticide Laws and my conclusion is that in States having both laws, the **manufacturer of Fertilizer-Pesticide Mixtures will be required to comply with the provisions of both laws,** and in most states this includes registration under both laws.

While most fertilizer manufacturers are familiar with the regulatory provisions of the States Fertilizer

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Laws, I believe that few of them are aware of the legal responsibilities they will assume in the marketing of pesticides in the form of Fertilizer-Pesticide Mixtures.

The use of Pesticides is essential in Agriculture today but I am sure everyone concerned will admit that the use of Pesticides is a controversial subject, particularly so in Fertilizer-Pesticide Mixtures. A few able scientists advocate the use of Fertilizer-Pesticide Mixtures while other equally qualified scientists disagree and recommend that these materials should be applied separately. The Regulatory Official has a very difficult job in determining the correct course in this complicated problem.

Most Control Officials can foresee the complications and dangers which lie ahead in the probable misuse of such materials and have, therefore, advised against their use, however, if the provisions of the laws are complied with, the mixtures must be registered.

The only claim supporting the use of Fertilizer-Pesticide Mixtures which is not controversial in my opinion, is that based on the economies of the practice. I predict that the general use of Fertilizer-Pesticide Mixtures will necessitate more laws and regulations.

Before entering this field of operation both the pesticide manufacturers and the fertilizer manufacturers should consider the complications and responsibilities which may

result in the marketing of these mixtures.



E. P. Ordas

Eugene P. Ordas, Head, product development division, Velsicol Corporation, after paying tribute to the research of the State and Federal agronomists, entered into a discussion of the need for additional knowledge along the lines of manufacturing and the numerous problems requiring chemical analysis:

We may rightfully ask, are the effects or problems arising from the application of a combination fertilizer-pesticide type of product expected to be significantly different than the effects which have been observed when the chemicals were applied separately? Many experiments and analyses have shown that the application of organic pesticides to the soil for the control of soil pests, presents no crop residue problem when they are used as recommended. Most, or nearly all of the plots and fields from which the crop samples were taken for analysis, had received fertilizer treatment.

Residues in the soil have been of considerable concern from two par-

ticular points of view. On one hand, we have questioned whether or not repeated applications of a pesticide to the soil will result in a gradual build-up to harmful levels. On the other hand, we have questioned the economics and have asked how many years or seasons will the pesticide persist in the soil, to give control, before treatment is necessary. To answer these questions, one must necessarily consider each pesticide in the light of its own physical and chemical properties.

Factors which will effect the persistence of the pesticide in the soil are its vapor pressure, chemical stability, the soil type, the susceptibility of the chemical to the attack of micro-organisms, the effect of a strong light, temperature, rainfall, and solubility in water. Controlled experiments have demonstrated that when insecticides have been applied at heavy dosages for the control of soil infesting insects, control has been obtained for several years after application. Chemical and bioassay analyses of soil samples from these plots have shown there to be a gradual but definite decrease in the soil insecticide content even though insect control is still obtained. The inference from these experiments is that once the infestation is under control, there is less probability of re-infestation.

Much of the foregoing discussion has related to the field aspects of this subject; however, we must also consider the manufacturing, regula-

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tion and storage aspects.

Since the pesticide should be applied at recommended rates, and also since the quantity of the fertilizer applied per acre and the fertilizer formula may be varied widely, we can speak only in general terms, at this time, regarding the pesticide formulations to be used and the manufacturing techniques for their incorporation. In almost all cases, pesticides are used at a low concentration when combined with fertilizer. Because of the obvious difficulty in obtaining uniform distribution of such a small proportion of pesticide in a large mass of granular fertilizer, it is generally recognized that a diluted form of the pesticide should be used. For example, if the recommended dosage of a pesticide is one pound per acre, to be applied with fertilizer at the rate of 400 pounds per acre, we would need to blend 20 pounds of 10% pesticide dust with 380 pounds of a fertilizer base computed to give desired formula in the finished blend. Since the amount of pesticide dust is only 5% of the

total, sufficient time must be allowed during blending for practical and uniform distribution of all ingredients. Depending upon the efficiency of the equipment and assuming a ribbon type of blender is used, the blending cycle has been stated to require ten to twenty minutes.

The choice of a carrier for organic insecticides used in fertilizer mixtures has been the subject of some discussion. Because of the possible tendency for the segregation of small particles of dry powder from the bulk of the fertilizer during storage or shipment, it is believed by some that a granular form of the insecticide should be used. In an ideal situation, the granular insecticide should be of the same average particle size and density as the fertilizer; however, a 30-60 mesh carrier of the Fullers Earth or Attapulgite types has been used with apparent success. Still other workers have effectively used a finely powdered insecticide since it can be more intimately mixed with the fertilizer granules. If a powdered form

of the insecticide is used, it is advisable to use a low absorbency type carrier and the insecticide should be applied to the carrier by direct impregnation. Commutation of this mixture is recommended to obtain an extremely fine state of sub-division of the particles and a uniform distribution of the pesticide. It is believed by some that a finely powdered insecticide will adhere to and uniformly coat the fertilizer particles.

Rigid control of the mixing and blending operation must be maintained and it is most desirable that each lot produced be chemically analyzed to assure the uniform distribution of the insecticide. In this respect a rapid and reliable chemical method for analysis is often the key to successful operation and performance.

Although different pesticides require different analytical methods, it is generally found that one of the most frequent sources of error in the analysis of any pesticide-fertilizer mixture lies in the sampling techniques and the method of pre-

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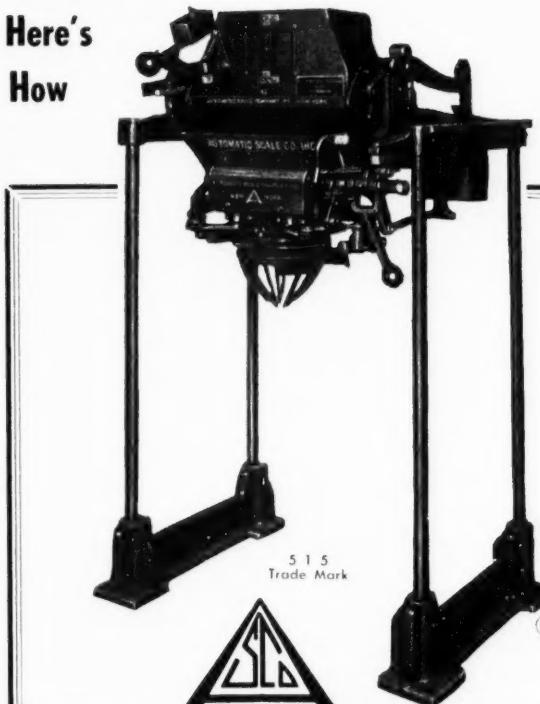
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paring the sample for analysis.

With regard to the shelf life or storage life of insecticides with fertilizers, there seem to be no general compilation of data. There have been reports in the literature that mixtures of insecticides with fertilizer have been kept in storage for periods varying from sixty days to one year without loss of insecticidal activity.

Where custom blending of pesticide-fertilizer mixtures is practiced, there is little occasion for storing the materials for long periods of time, but where there is a possibility of storage or hold-over of formulated stocks, there is concern over the compatibility of the pesticide-fertilizer ingredients with each other and the possibility of gradual loss of toxicant. In this respect, the construction of the shipping or storage container, and the percentage of moisture in the mixture may be of the greatest importance, but other possible factors affecting storage life may be the pH of the mixture and the relative hydrolytic sta-

bility of the pesticide, excessive temperatures in the warehouse, and the presence of free or extractable iron or iron salts.

Pesticide-fertilizers mixtures have been demonstrated to be entirely practical or economical. Yet there still is reluctance on the part of some authorities to recognize or sanction their use. This is certainly understandable since there are very specific questions which do arise. We should, however, recognize the advantages and consider possible disadvantages if any, but above all, we should be tolerant of the situation which confronts us during the heat of commercial development. It is especially necessary, in these times, that we avail ourselves of every opportunity to observe the effects of new technological developments and when definite problems in application do arise during the course of our investigations, they should be attacked in their order of significance and occurrence and the evidence should be used as a guide to our search for solution.

MAYFIELD ELECTED

Paul Mayfield of Hercules Powder Company, Wilmington, Delaware, was elected president of the Association for a one-year term to succeed Mr. Mohr who has served as NAC president for the past two years. He will serve as a member of the NAC board of directors.

Mr. Mayfield is general manager of the Hercules' Naval Stores Department and has served as the NAC vice president for the past two years.

W. W. Allen, Dow Chemical Company, Midland, Michigan, was elected vice president of the Association to succeed Mr. Mayfield. Mr. Allen has served on the NAC board of directors for the past several years.

Lea S. Hitchner was re-elected executive secretary of the Association, the post he has held since 1940.

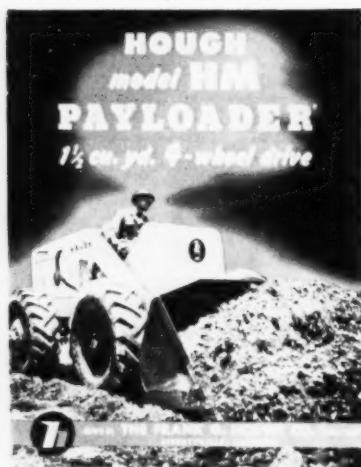
Hitchner was elected the first president of the Association following its organization in 1933 and

served from that date to 1940. He was elected executive secretary of the Association at that time and has retained that post to this date. According to Arthur W. Mohr, president of the Association, Hitchner was instrumental in the founding of the present Association and has been one of the leaders of the pesticides industry for some thirty years.

Three new members of the board of directors were elected by the member companies for terms of five years. New members are: John Kennedy, in charge of agricultural chemical sales, Stauffer Chemical Company, New York, N. Y.; D. F. Murphy, vice president, Rohm & Haas Company, Philadelphia, Pa.; and G. C. Romig, president of American Chemical Paint Company, Ambler, Pa.

Those retiring from the board are: G. F. Leonard, formerly executive vice president of Tobacco By-Products and Chemical Corporation, Richmond, Va.; W. C. Bennett, president, Phelps Dodge Refining Corporation, New York, N. Y.; Ernest Hart, executive vice president, Food Machinery & Chemical Corporation, New York, N. Y.; and J. Hallam Boyd, executive vice president, Commercial Chemical Company, Memphis, Tenn.

Cover of the new catalog which describes the Model HR 4 wheel drive Payloader tractor-shovel. Profusely illustrated, it tells the story of this unusual 1 cubic yard machine. For free copy write for #255 from The Frank G. Hough Co., 702 Seventh Street, Libertyville, Illinois.



FERTILIZER TAX TAG SALES AND REPORTED SHIPMENTS (In Thousands of Equivalent Short Tons) Compiled by The National Fertilizer Association

	August 1953	1952	July 1953	1952	Jan.-July 1953	1952	Apr.-May-June 1953	1952
Virginia			11	12	1,574	1,596	322	331
N. Carolina	23	24	3	10	780	753	635	691
Georgia	47	10	37	30	1,167	1,132	684	694
Florida	55	45	44	59	771	725	243	134
Alabama			13	50	902	924	332	358
Tennessee	14	15	19	16	456	466	307	310
Arkansas	7	8	24	18	253	312	137	196
Louisiana	8	11	14	8	232	249	101	101
Texas	19	20	16	20	389	399	161	139
Oklahoma			7	6	81	116	27	48
TOTAL SOUTH	173	133	193	229	6,610	6,672	3,191	3,202
California							249	229
TOTAL OTHER							249	229
GRAND TOTAL	178	133	193	229	6,610	6,672	3,440	3,431

MARKETS

Fertilizer tax tag sales and reports of fertilizer shipments for August, as reported by officials in seven southern states, were equivalent to 178,000 tons of fertilizer.

This is 45,000 tons more than the 133,000 tons registered for the same month in 1952. However, the figure for the first half of 1953—6,610,000—tons is 62,000 tons below the amount reported during the like period a year ago.

ORGANICS: Rather little interest in organics at the moment with Domestic Nitrogenous sales comfortable at \$3.15 to \$4.50 per unit Ammonia, bulk, f.o.b. production point. Imported Nitrogenous Tankage, in bags, occasionally is offered at around \$4.75 to \$5.00 per unit of Ammonia, CIF Atlantic ports.

CASTOR POMACE: Current market is around \$25.00 per ton, bagged, for domestic material f.o.b. Northeastern production points. Imported material, depending on the quality, is around \$34.00 to \$35.00 per ton, bagged, CIF Atlantic ports.

DRIED BLOOD: Unground bagged Blood at Chicago is around \$5.75 to \$6.25 per unit of Ammonia and at New York nominally \$5.25.

POTASH: Movement against domestic contracts is fair to good. No change in domestic prices is noted.

GROUND COTTON BUR ASH:

This source of Potash, primarily in the form of Carbonate of Potash, continues available for prompt and future shipment at prices approximating the cost of Domestic Sulphate of Potash delivered destinations.

PHOSPHATE ROCK: Movement against contracts is increasing somewhat. Supply is adequate and prices firm.

SUPERPHOSPHATE: Movement against contracts is fair and prices steady to strong, particularly for Triple Superphosphate which is tight in supply.

AMMONIUM NITRATE: No change in prices and market definitely tight.

SULPHATE OF AMMONIA: Current movement continues spotty. Most domestic producers have met, by equalization, the prices of imported materials at domestic ports.

NITRATE OF SODA: Both imported and domestic prices were reduced effective September 1st by \$4.00 per ton, making the new price at the ports \$53.00 bagged and at interior production point \$47.00 bagged or \$43.50 bulk.

CALCIUM AMMONIUM NITRATE: Current price continues at \$51.25 per ton, bagged, f.o.b. cars at ports.

GENERAL: Adequate supplies of most fertilizer raw materials appear available for the coming season except for possibly Triple Superphosphate and Ammonium Nitrate.

PACIFIC N. W. CONVENTION PLANS

When the delegates meet at Harrison Hot Springs Hotel, they will find a cocktail party waiting at 6:30 November 3. The business session convenes the next morning at 10. That evening a buffet dinner will be served. November 5 a cocktail party and the annual banquet are scheduled. As reported here last month, reservations should be made direct to the hotel at Harrison Hot Springs, British Columbia.

Outstanding speakers, scheduled to be heard at the convention include:

Arthur Laing, Member Legislative Assembly, Province of British Columbia; **Russ Coleman**, President National Fertilizer Association; **Paul Truitt**, President American Plant Food Council; **W. F. Price**, Plant Food Division, Swift & Company, Chicago; **John Smith**, Safety Engineer, Spencer Chemical Company.

NEW JERSEY CONFERENCE WELL ATTENDED

A big group met September 24 at the College of Agriculture, New Brunswick, N. J. to hear the schedule of speakers published here last month. Russell Coleman was unable to be present and his paper was read by v-p W. R. Allstetter of NFA.

Firman E. Bear presented the other major paper of the morning session on Trace Element Research and supplied those in attendance with a wealth of data on his findings in New Jersey soil.

Potash Companies Invite ASA Members

Five potash companies with mines near Carlsbad, New Mexico have cordially invited members and guests attending the American Society of Agronomy annual meetings in Dallas, Texas to tour their mines and refineries Saturday, November 21st, 1953.

United States Potash Company, Potash Company of America, International Minerals & Chemical Corporation, Duval Sulfur & Potash Company, and Southwest Potash Company are cooperating in the tour.



APFC PRESENTS SOIL BUILDERS AWARD: Farm magazine writers who most effectively carried the message of soil building to their readers during the past year were honored by APFC on September 15. Left to right, Paul T. Truitt, APFC

president; Under Secretary of Agriculture True D. Morse, who made the awards; Jim Roe, Managing Editor, *Successful Farming*; M. C. Gilpin, Editor, *Pennsylvania Farmer*, who received the award on behalf of the late J. B. R. Dickey, a contributing editor.

UDET Establishes Eastern Organization

Universal Detergents, Inc., Long Beach, California has opened Eastern sales offices in the Graybar Building, 420 Lexington Avenue, New York 17, headed by F. H. "Doc" Guernsey, Eastern sales manager.

Berkshire Chemicals, Inc. have been appointed as Eastern distributors of agricultural products for Universal. W. L. Gay, Berkshire vice-president is in charge of sales in the entire area east of the Mississippi.

Quick-Action Unloading Features Bulkmaster Transport

A transport that unloads at the rate of a ton a minute is featured by Highway Equipment Company, Cedar Rapids, Iowa. It is part of their "New Leader" line of Bulkmaster transports, with motor driven auger raising and lowering and extending hydraulically. It can be loaded from a box-car conveyor through a rear access panel. Top loading doors measure 27x60 inches, and has a 36" wide chain conveyor.

Consolidated Chemical Offers New Catalogue

To celebrate their 75th Anniversary in the industrial chemical field, Consolidated Chemical Industries Inc. have put out a new 104 page catalogue, containing a full account of the Company's history, growth, and numerous products,

complete with photographs of their eleven plants in the United States and Argentina, product descriptions, specifications, technical data (including useful tables, graphs, and general information), and packaging and shipping information. Copies can be obtained directly from Consolidated Chemical Industries Inc., 630 Fifth Avenue, New York, 17, N. Y.

OBITUARIES

E. D. Alexander, 1919 graduate U. of Georgia and teacher there until 1925 when he became extension agronomist. Pioneer in extension work, active in formation of Georgia Plant Food Educational Society. Died September 27 in Athens. He received the USDA distinguished service award from the hands of Secretary of Agriculture this year.

* * *

Walter H. Klee, 58, vice president of Naco Fertilizer, died September 3 in Jacksonville after a brief illness. He joined W. R. Grace & Co. of which Naco is subsidiary, in 1912, and became Naco's Jacksonville office manager in 1925. He was made vice-president three years ago.

* * *

Furman Smith, 1915 to 1950 sales manager of American Limestone Co., died in Charlotte, N. C. October 3. He was a pioneer in the use of limestone in agriculture.

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YOUNG SUPERINTENDENT available. Proven ability to coordinate production, maintenance, purchasing, personnel. Prefer vicinity of Indiana, but will consider any location. Presently employed by leading manufacturer. Box # 801, c/o Commercial Fertilizer, 75 Third St., N. W., Atlanta, Ga.

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WANTED TO PURCHASE: Fertilizer plant, dry mixing, or acidulation. Box #37, c/o Commercial Fertilizer, 75 Third St., N. W., Atlanta, Ga.

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WANTED: Superintendent for new fertilizer plant located in South. Please give details as to experience, salary expected, State education, Age & Answer in long hand. Box #63, c/o Commercial Fertilizer, 75 third St., N. W., Atlanta, Ga.

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AS OF OCTOBER 1, 1953

1. Publisher, editor, etc.:

Publisher: Walter W. Brown Publishing Co., Inc., 75 Third St., N.W.
Editor: Bruce Moran, 75 Third St., N.W.
Business Manager: V. T. Crenshaw, 75 Third St., N.W.

2. Owner (if corporation, name of corporation, and immediately below the names of all stockholders owning 1% or more of stock):

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Ernest H. Abernethy, 75 Third St., N.W.
Virginia T. Crenshaw, 75 Third St., N.W.

3. Bondholders, mortgagees, etc.:

None.

Signed: ERNEST H. ABERNETHY, President.

Sworn to and subscribed before me, a Notary Public, this 24th day of September, 1953.

MARY C. LAYMAN, Notary Public.

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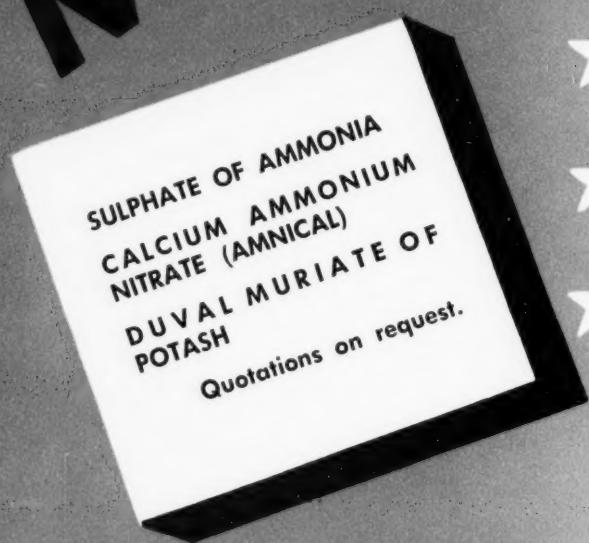
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